Final

Environmental Impact Statement

for the Proposed Widening of the

Pascagoula Lower Sound/Bayou Casotte Channel

Jackson County, Mississippi

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FINAL
ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROPOSED WIDENING OF THE
PASCAGOULA LOWER SOUND/BAYOU CASOTTE CHANNEL
JACKSON COUNTY, MISSISSIPPI

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Acronyms and Abbreviations

ACHP	Advisory Council for Historic Preservation
AET	Apparent Effect Threshold
AFCA	Anadromous Fish Conservation Act
APE	Area of Potential Effect
ATON	Aids to Navigation
AVS	Acid volatile sulfide
AWOIS	Automated Wreck and Obstruction Information System
BCDMMS	Bayou Casotte Dredge Material Management Site
bcm	Bulk cubic meters
BCHIP	Bayou Casotte Harbor Improvement Project
BG	Block Group
BGEPA	Bald and Golden Eagle Protection Act
BHC	Benzene hexachloride
BLS	Bureau of Labor Statistics
BO	Biological Opinion
CAA	Clean Air Act
CAP	Captain of the Port
CBRA	Coastal Barrier Resources Act
CBRS	Coastal Barrier Resources System
CEQ	President's Council on Environmental Quality
CERCLIS	Comprehensive Environmental Response, Conservation, and Liability Information System
C.F.R.	*Code of Federal Regulations*
cfs	Cubic feet per second
CH_4	Methane
Chl-a	Chlorphyll-*a*
CIKR	Critical Infrastructure and Key Resources
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CO-OPS	Center for Operational Oceanographic Products and Services
CORRACTS	Corrective Actions
CPP	Coastal Preserves Program
CT	Census tract
CWA	Clean Water Act
cy	Cubic yard

CZMA	Coastal Zone Management Act
DAP	Diammonium phosphate
DOE	U.S. Department of Energy
DOL	Department of Labor
dB	Decibel
dBA	A-weighted (filtered) noise levels (decibels)
DDD	Dichlorodiphenyldichloroethane (metabolite of DDT)
DDE	Dichlorodiphenyldichloroethylene (metabolite of DDT)
DDT	Dichlorodiphenyltrichloroethane
DEIS	Draft Environmental Impact Statement
DMMP	Dredged Material Management Plan
DNL	Day-night noise level
DO	Dissolved oxygen
DOE	Department of Energy
DOI	Department of the Interior
DTSC	Department of Toxic Substance Control
EDR	Environmental Data Resources, Inc.
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EOR	Enhanced oil recovery
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ERL	Effects Range-Low
ERM	Effects Range-Medium
FAA	Federal Aviation Authority
°F	Degrees Fahrenheit
Fed. Reg.	*Federal Register*
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Administration
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FINDS	Facility Index System
FMP	Fishery Management Plan
FOSC	Federal On-Scene Coordinator
FPPA	Farmland Protection Policy Act
FRA	Federal Railroad Authority
FSEIS	Final Supplemental Impact Statement

FTA	Federal Transit Authority
FWCA	Fish and Wildlife Coordination Act
GBP	Gulfport-Biloxi-Pascagoula
GHG	Greenhouse gas
GRN	Gulf Restoration Network
GUIS	National Park Service's Gulf Island National Seashore
GIS	Geographic Information System
GIWW	Gulf Intracoastal Waterway
GLE	Gulf LNG Energy
GMFMC	Gulf of Mexico Fisheries Management Council
GRBO	Gulf Regional Biological Opinion
GRT	Gross register tonnage
HAPC	Habitat Areas of Particular Concern
HAZNET	Hazardous Waste Manifest
HHS	Health and Human Services
hp	Horsepower
HTRW	Hazardous, toxic, and radioactive waste
HQUSACE	Headquarters U.S. Army Corps of Engineers
HUD	Department of Housing and Urban Development
Hz	Hertz
IH 10	Interstate Highway 10
IMMS	Institute of Marine Mammal Studies
JCPA	Jackson County Port Authority
L_{eq}	Equivalent (or average) noise level
$L_{eq}(h)$	Equivalent (or average) noise level over 1 hour (e.g., traffic noise)
LNG	Liquefied natural gas
LOA	Length overall
LPC	Limiting permissible concentration
LQG	Large quantity generator
LZA	Littoral Zone Area
MCAS	Mississippi Coast Audubon Society
mcy	Million cubic yards
MDAH	Mississippi Department of Archives and History
MDEQ	Mississippi Department of Environmental Quality
MDES	Mississippi Department of Employment Security
MDMR	Mississippi Department of Marine Resources
MDWFP	Mississippi Department of Wildlife, Fisheries, and Parks
MEMA	Mississippi Emergency Management Agency

MG	Mississippi Gasification
mg/L	Milligrams per liter
mL	Milliliters
MLLW	Mean lower low water
mm/yr	Millimeters per year
mm/yr	Millimeters/year
MMNS	Mississippi Museum of Natural Science
MMPA	Marine Mammal Protection Act
MNHP	Mississippi Natural Heritage Program
MPC	Mississippi Phosphates Corporation
MPRSA	Marine Protection, Research, and Sanctuaries Act
MS 63	Mississippi State Highway 63
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSI	Maritime Simulation Institute
msl	Mean sea level
MSOGB	Mississippi State Oil and Gas Board
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAS	National Audubon Society
NBIC	National Ballast Information Clearinghouse
NCA	National Coastal Assessment
NCDC	National Climatic Data Center
NCP	National Contingency Plan
NEPA	National Environmental Policy Act of 1969
NFRAP	No further remedial action planned
NFWL	National Fish and Wildlife Laboratory
ng/g	Nanograms per gram
ng/L	Nanograms per liter
NH_3	Un-ionized ammonia
NHL	National Historic Landmarks
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	Nitrogen dioxide
NO	Nitric oxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System

NPL	National Priority Listing
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	National Response System
NRT	National Response Team
NWI	National Wetlands Inventory
O_3	Ozone
ODDD	Ortho,para'-dichlorodiphenyldichloroethane (isomer of DDD)
ODDE	Ortho,para'-dichlorodiphenyldichloroethylene (isomer of DDE)
ODDT	Ortho,para'-dichlorodiphenyltrichloroethane (isomer of DDT)
ODMDS	Ocean Dredged Material Disposal Site
OPA	Otherwise Protected Area
OPC	Office of Pollution Control
OPDDD	Ortho,para'-1,1-dichloro-2,2-bis(4-chlorophenyl)ethane
OPDDE	Ortho,para'-1,1-dichloro-2,2-bis-(4-chlorophenyl)ethylene
OPDDT	Ortho,para'-dichlorodiphenyltrichloroethane
OSHA	Occupational Safety and Health Administration
p	Probability
PAH	Polycyclic aromatic hydrocarbons
Pb	Lead
PBOP	Pascagoula base oil project
PCB	Polychlorinated Biphenyl
PCE	Primary constituent element
PEL	Probable Effects Level
PHNC	Pascagoula Harbor Channel
PL	Public Law
PLS	Pascagoula Lower Sound
PM_{10}	Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 microns
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 microns
PPDDD	Para, para isomer of dichloro diphenyl dichloroethane
PPDDE	1,1-dichloro-2,2-bis(p-chlorophenyl)ethane
PPDDT	1,1,1-trichloro-2,2-bis (p-chlorophenyl)ethane
ppm	Parts per million
ppt	Parts per thousand
PTTL	Public Trust Tidelands Law

PWCS	Ports, Waterways, and Coastal Security
PWSA	Ports and Waterways Safety Act
RCRA	Resource Conservation and Recovery Act
RHA	Rivers and Harbors Act
RL	Range low
SAV	Submersed aquatic vegetation
SCV	Submerged combustion vaporizers
SEM	Simultaneously extracted metals
SHPO	State Historic Preservation Office
SHWS	State hazardous waste sites
SIP	State Implementation Plan
SO_2	Sulfur dioxide
SO_x	Sulfur oxides
SQuiRTs	Screening quick reference tables
SVOC	Semivolatile organic compound
TCDD	2,3,7,8-tetrachlorodibenzo-*p*-dioxin
TEL	Threshold Effects Level
TEQ	Toxicity equivalency quotient
TKN	Total Kjeldahl nitrogen
TMDL	Total Maximum Daily Load
TN	Total nitrogen
TNC	The Nature Conservancy
TOC	Total organic carbon
TP	Total phosphorus
TPWD	Texas Parks and Wildlife Department
tpy	Tons per year
TRIS	Toxic chemical release inventory system
TSDF	Treatment, storage, and disposal site
TSS	Total suspended solids
TWIS	Transportation Workers Identification Credential
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
U.S.C.	*United States Code*
US 90	U.S. Highway 90
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDOC	United States Department of Commerce
USFDA	United States Food and Drug Administration

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTC	Universal Time Coordinated
VCP	Voluntary cleanup program
VOC	Volatile organic compounds
WMEC	U.S. Coast Guard medium endurance cutter
WPC	U.S. Coast Guard coastal patrol cutters
WRDA	Water Resources Development Act

Executive Summary

Authorization. The United States Army Corps of Engineers (USACE), Mobile District, Regulatory Division, published a Notice of Intent (NOI) in the *Federal Register* (Fed. Reg.), Volume 76, Number 181, on Monday, September 19, 2011, to announce the USACE's intention to prepare an Environmental Impact Statement (EIS) for a Permit Application for Widening the Lower Sound and Bayou Casotte segments of the Pascagoula Navigation Project, as well as limited widening (easing) of the northern portion of the Horn Island Pass channel to facilitate the transition between the Horn Island Pass and Lower Sound channel segments, in the Port of Pascagoula, Jackson County, Mississippi. The USACE Mobile District has prepared this EIS to assess the potential impacts associated with the channel widening and associated placement of dredged material.

The USACE is the lead Federal agency for the preparation of this EIS in compliance with the requirements of NEPA and the President's Council on Environmental Quality (CEQ) regulations for implementing NEPA (Title 40 *Code of Federal Regulations* [C.F.R.] Parts 1500–1508). The USACE is evaluating the Jackson County Port Authority/Port of Pascagoula (Port) application for a Department of the Army permit under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. The National Marine Fisheries Service (NMFS) and U.S. Coast Guard (USCG) are cooperating agencies for the preparation of this EIS.

Background. This EIS was prepared in support of the regulatory process for the specific permit application and proposed project. The proposed Federal action is the issuance of a permit to dredge or excavate adjacent to a Federal Navigation Channel in or affecting navigable waters of the U.S. The EIS evaluates potential impacts on the human environment from proposed channel widening activities and the placement of dredged material in an Ocean Dredged Material Disposal Site (ODMDS) and the designated Littoral Zone Area (LZA) east and south of Horn Island. The USACE may ultimately make a determination to approve the permit, approve the permit with conditions, or deny the permit for the above project. This EIS reflects public comments made on the Draft EIS (DEIS) during the public review period that ended on May 29, 2012.

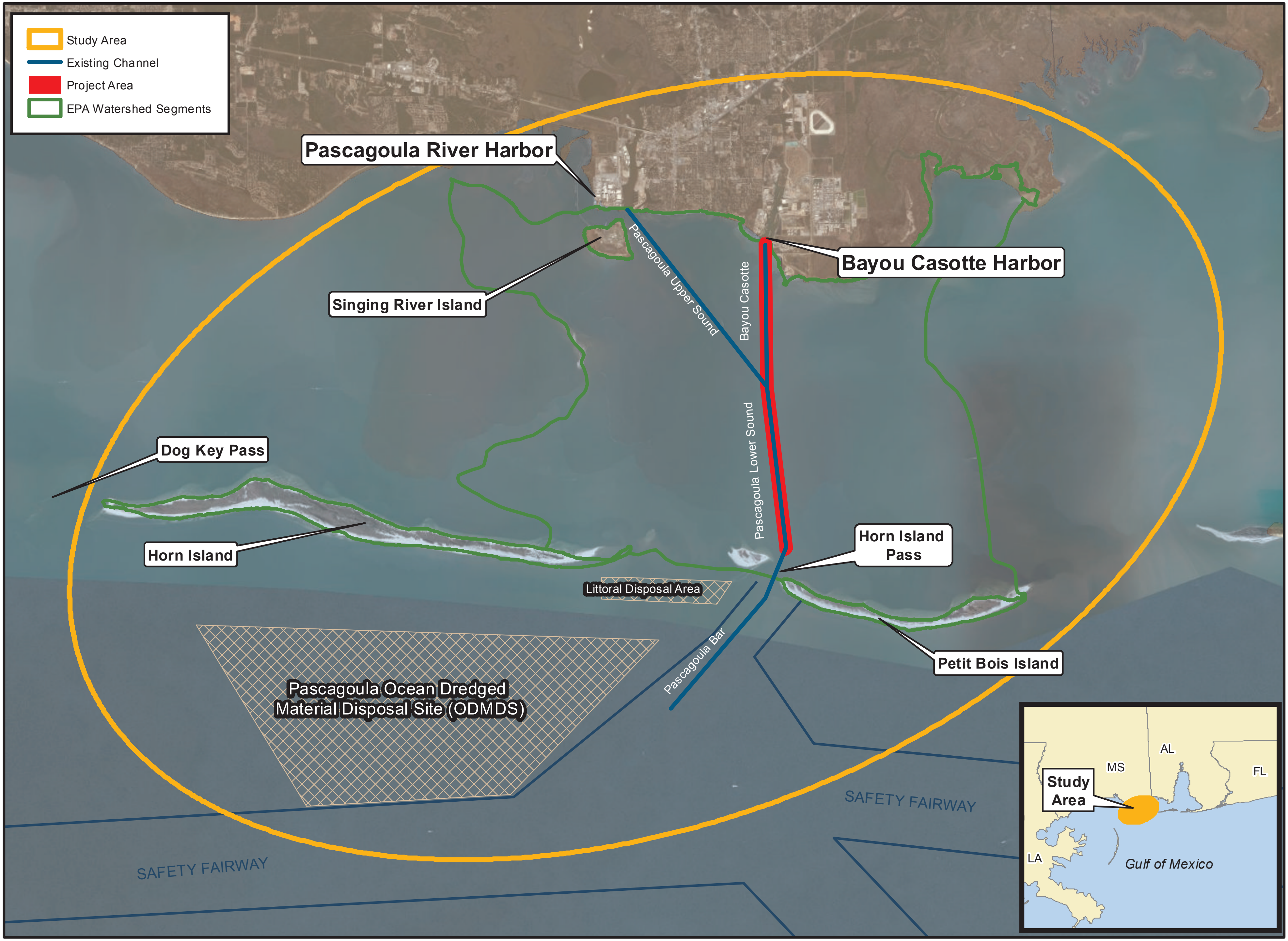
The Regulatory EIS will also support non-Federal construction of the project. A separate Civil Works EIS and Feasibility Study are being prepared concurrently by the USACE Planning Division to evaluate whether there is a Federal interest in assuming maintenance of the widened channel (Public Law (PL) 99-662; 33 U.S.C. 2232, as amended). It is anticipated that the excavated area (or channel improvements) would become part of the Federal Navigation Channel and that the Federal government would assume maintenance of the widened channel (pending approval of the USACE Civil Works EIS). The outcome of the Civil Works EIS will be evaluated as part of the process to determine whether the Federal government will assume maintenance responsibilities for the widened portions of the channel.

Purpose and Need. The purpose for the project, as stated by the Applicant, is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the turning basin in Bayou Casotte, alleviate current vessel transit restrictions, and increase travel efficiencies for vessel transit. The current width of the channel imposes transit limitations for marine vessel traffic, which creates delays for vessels and fosters inefficient use of the channels and harbor. The need for the proposed project is a reduction in present transit restrictions along Pascagoula Lower Sound and Bayou Casotte navigation channel. The existing federally authorized channel dimensions restrict deep-draft vessels to one-way traffic, restrict vessels greater than 700 feet length overall (LOA) or draft greater than 36 feet to daylight travel, and impose restrictions on travel due to wind and current conditions.

Description of Proposed Project. The proposed project evaluated in this EIS is the dredging of approximately 38,200 linear feet (7.2 miles) of the Pascagoula Lower Sound/Bayou Casotte Federal Navigation Channel segment to widen the existing channel from the federally authorized width of 350 feet and depth of –42 feet mean lower low water (MLLW) (with 2 feet of allowable overdepth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline, and to the existing federally authorized depth of –42 feet MLLW. The proposed project would include placement of the dredged material resulting from the channel modification (referred to as new work dredged material).

Study Area and Project Area. The Port of Pascagoula is located in southeastern Mississippi on the Mississippi Sound in/adjacent to the City of Pascagoula in Jackson County, Mississippi, south of Interstate Highway 10 and U.S. Highway 90. The Bayou Casotte Harbor and Pascagoula River Harbor are accessible via navigation channels that are part of the Pascagoula Navigation Project, which extends approximately 18 miles offshore from the Port. The Pascagoula Navigation Project enters the Mississippi Sound from the Gulf of Mexico, passes between Horn Island and Petit Bois Island, crosses the Gulf Intracoastal Waterway and then branches into two channel segments that provide access to the Bayou Casotte and Pascagoula River harbors. The eastern channel leads to the Bayou Casotte Harbor and the western channel leads to the Pascagoula River Harbor. The proposed project encompasses the Pascagoula Lower Sound and Bayou Casotte channel that extends from the northern limit of Horn Island Pass to the Bayou Casotte Harbor south of the turning basin.

A study area was defined to represent the area of resources potentially and indirectly affected by the proposed project. The project area is a subset of the study area, defines the area of direct impacts on the resources, and is represented by the existing channel footprint and proposed alternatives. The study area and project area are shown in Figure ES-1.



US Army Corps of Engineers
Mobile District

Figure ES-1

Project and Study Area

Bayou Casotte Harbor Channel Improvement Project

0 2.5 5 Miles

Proposed Alternatives. In accordance with NEPA and implementing regulations issued by the CEQ (40 C.F.R. Parts 1500–1508); and USACE implementing regulations under 33 C.F.R. Part 325, Appendix B, this EIS is intended to inform decision makers and the public of the likely environmental consequences of the proposed action and alternatives. Alternatives evaluated to meet the purpose and need for the proposed project included different channel widths and alternatives for dredged material placement. Nine action alternatives (and the No-Action Alternative) were considered in the preliminary array of alternatives. Seven of the action alternatives were eliminated because they did not meet the screening criteria (including purpose and need of the project). Two action alternatives and the No-Action Alternative were carried through for evaluation in the EIS.

Alternative 1, the Applicant's Preferred Alternative (Preferred Alternative), includes dredging approximately 38,200 feet (7.2 miles) adjacent to the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segments to widen the channel 100 feet on the west side, parallel to the existing channel centerline, to the existing depth of –42 feet MLLW (with authorized advanced maintenance and allowable overdepth excavation consistent with the Federal Project), and the placement of the approximately 3.4 million cubic yards (mcy) of dredged material. Under the Preferred Alternative, dredged material management would include placement of approximately 3.7 percent (125,000 cy) of the dredged material in the designated LZA located east and south of Horn Island and placement of the remainder of the material (approximately 3.3 mcy) in the Pascagoula ODMDS south of Horn Island. Twenty-three Aids-to-Navigation (ATONs) (eight existing range structures, ten buoys, and five fixed lights) would require relocation under the Preferred Alternative. There is a 12-inch-diameter pipeline that crosses Pascagoula Lower Sound Channel designated as a "spare" line that will be surveyed prior to construction and may be removed under this alternative. The majority of the LZA is located within the National Park Service (NPS) Gulf Islands National Seashore Boundary. The Port of Pascagoula is coordinating with and applying for a Special Use Permit with NPS. If a permitted beneficial use site becomes available for use prior to construction, it will be considered for placement of suitable material.

Alternative 2 includes dredging approximately 38,200 feet (7.2 miles) along the length of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segments to widen the channel by 50 feet on each side, parallel to the existing channel centerline, to the existing depth of –42 feet MLLW (with authorized advanced maintenance and allowable overdepth excavation consistent with the Federal Project), and the placement of approximately 3.3 mcy of associated dredged material. Under Alternative 2, dredged material management will include beneficial use placement of approximately 9.6 percent (315,000 cy) of the dredged material in the designated LZA located east and south of Horn Island and placement of the remainder of the material (approximately 3.0 mcy) in the Pascagoula ODMDS south of Horn Island. Twenty-eight ATONs (eighteen buoys and ten fixed lights) would require relocation under Alternative 2. The spare 12-inch-diameter pipeline that crosses a portion of the channel to be dredged may be removed under this alternative. As discussed under Alternative 1, the majority of the LZA is located within the NPS Gulf Islands National Seashore Boundary. The Port of Pascagoula is coordinating with and applying for a Special

Use Permit with NPS. If a permitted beneficial use site becomes available for use prior to construction, it will be considered for placement of suitable material.

The No-Action Alternative represents the future without project condition to compare to the final array of alternatives. Under the No-Action Alternative, the Bayou Casotte and Pascagoula Lower Sound channels would remain at present federally authorized widths and depths. No ATONs would require relocation. No new dredged material would be generated and no material would be available for beneficial use. Dredged material from continued maintenance would still be available.

Environmental Consequences. The EIS addresses the potential impacts of the proposed project on the natural and human environment. An impact is defined as a consequence from modification to the existing environment due to a proposed action or alternative. Impacts can be beneficial or adverse, can be a primary result of an action (direct) or a secondary result (indirect), and can be permanent or long-lasting (long-term) or temporary and of short duration (short-term). Impacts are evaluated for significance in terms of context and intensity.

Impacts of the No-Action Alternative, Preferred Alternative, and Alternative 2 on the environment are summarized in Table ES-1. Adverse impacts of the proposed project are primarily temporary and minor, and are associated with construction (widening the channel) and placement of dredged material. These include temporary, minor impacts to air quality, noise, water quality, and marine aquatic communities (from turbidity). Permanent impacts under the Preferred Alternative and Alternative 2 include conversion of 87.6 acres of shallow aquatic habitat to deeper habitat. Permanent relocation of ATONs would occur under the Preferred Alternative. Benefits of the proposed project include placement of dredged materials appropriate for beneficial use in the LZA, which would help maintain sediment budgets in the project area. As a cooperating agency on this EIS, the NMFS is developing a Biological Opinion for potential impacts to the Gulf sturgeon and is consulting with the USACE with respect to potential impacts to Essential Fish Habitat in the project area. Anticipated impacts to cultural resources eligible for listing in the National Register of Historic Places within the area of potential effect, unless avoided, will require mitigation actions developed through a Memorandum of Agreement, which will include the Mississippi Department of Archives and History (MDAH), USACE, and Advisory Council for Historic Preservation. The USACE Mobile District has proposed a draft work plan for the archaeological Phase III data recovery of the 22JA516 archaeological site if the site cannot be avoided. The proposed plan contains environmental and site-specific cultural overviews, an overview of completed cultural resources work at the site, a research design, Phase III archaeological methods, laboratory and specialized analysis methods, methods for curating materials, public interpretation/education, USACE-prepared Plan for the Treatment of Human Remains, and a project schedule. The USACE Mobile District has also initiated consultation with the MDAH and interested federally recognized Native American tribes.

Table ES-1
Summary of Impacts by Alternative

<table>
<tr><th>Resource</th><th>No-Action Alternative</th><th>Preferred Alternative</th><th>Alternative 2</th></tr>
<tr><td>Geology</td><td>No change from existing conditions. Negligible changes to bottom depths of existing channel due to sedimentation and continued maintenance dredging.</td><td>No significant adverse impacts are anticipated. About 3.4 mcy of new work sediments and placement at approved LZA and ODMDS, including about 125,000 cy of littoral sands for beneficial use. Dredging and relocation of sediments will not interfere with natural movement and deposition of sediments in the Sound.</td><td>No significant adverse impacts are anticipated. Similar to the Preferred Alternative except that dredge volumes are smaller. Removal and relocation of approximately 3.3 mcy of sediment to designated placement areas, including approximately 315,000 cy of littoral sands.</td></tr>
<tr><td>Coastal Processes</td><td>No changes to existing conditions are anticipated. Impacts limited to those associated with continued maintenance dredging of the channels.</td><td colspan="2">No significant impacts are anticipated. Dredging and relocation of sediments will not impact overall coastal processes in the Sound. Placement of dredged sediments in the Littoral Zone Area (LZA) may have a positive effect by placing more sand into the littoral drift along Horn Island, thus slightly reducing erosion. Most of the LZA is within the boundaries of the Gulf Islands National Seashore and the JCPA is coordinating with the National Park Service to obtain permits for placing sediments in the LZA. Sediments not appropriate for the LZA will be placed in the Pascagoula Ocean Dredged Material Disposal Site (ODMDS), where there is ample capacity to accommodate dredged material for both alternatives, in addition to sediments anticipated from other activities in the project area, as described in the Dredged Material Management Plan.</td></tr>
<tr><td>Bathymetry</td><td>No changes to existing conditions are anticipated. Minor changes due to sediment deposition and continued maintenance dredging will continue.</td><td colspan="2">Bathymetry in the dredging corridor will be permanently changed from a current depth of 9 to 13 feet to -42 feet MLLW, consistent with the authorized depth of the existing channel. These changes would not impact areas outside of the physical disturbance and permanent alteration would be minor. The change to approximately 0.001 square mile of the bay bottom is not anticipated to adversely impact circulation patterns and other water movements. Temporary increase in elevation at dredge material placement sites will not affect currents, tides or other water movements.</td></tr>
<tr><td>Hydrodynamics</td><td>No changes to existing circulation patterns, tides, wave action, or salinity are anticipated under existing conditions.</td><td colspan="2">No significant adverse impacts to the hydrodynamics of the Mississippi Sound, including tides, currents and salinity patterns, are expected. Placement of beneficial use material will help restore littoral drift. Small reduction in time required for salinity levels to return to normal after heavy rain due to channel widening may occur. Impacts to salinity gradient would be negligible and therefore little effect on salinity concentrations during low flows is anticipated. With no change in the barrier island opening, no significant change or adverse impacts to tides, tidal currents or storm surge propagation potential would be expected.</td></tr>
<tr><td rowspan="2">Navigation and Port Facilities</td><td rowspan="2">Operational constraints would continue to occur. The current conditions restrict deep-draft vessels to one-way traffic, restrict vessels greater than 700 feet length overall (LOA) or draft greater than 36 feet to daylight travel, and impose restrictions on travel due to wind and current conditions..</td><td colspan="2">No adverse impacts anticipated under either the Preferred Alternative or Alternative 2. Based on available information for vessel transits, no increases in vessel traffic are anticipated beyond that anticipated without the project. Two-way traffic and additional nighttime transits will allow more flexibility in vessel arrival and departure times. No significant effect on the Port's commodity base; deliveries of LNG will be expedited with fewer diversions to alternate ports. No significant effect on charter or recreational boats, which are not restricted to deep shipping channels.</td></tr>
<tr><td>The Preferred Alternative will impact existing USCG-maintained ATON along the western side of the channels. Eight range structures, five lights, and ten buoys will be relocated.</td><td>Alternative 2 will impact existing USCG-maintained ATON along the eastern and western sides of the channels. Eighteen buoys and ten fixed lights will be relocated.</td></tr>
<tr><td>Air Quality</td><td>No change from existing conditions. However, emissions expected to continue due to continued dredging and sediment management activities.</td><td>Relatively small increase in emissions when compared to existing sources in Jackson County, and thus minor short-term impacts anticipated as a result of additional air emissions from harbor vessels and land-based mobile sources (primarily combustion emissions) during channel widening activities. No long-term adverse impacts are expected.</td><td>Similar to proposed project, except that emissions will be less as a result of a smaller dredging effort. Short term impacts anticipated. No long-term adverse impacts are expected.</td></tr>
</table>

Table ES-1, cont’d

Resource	No-Action Alternative	Preferred Alternative	Alternative 2
Noise	No change from existing conditions. Noise levels consistent with ongoing Port and maintenance dredging activities.	Noise impacts will be minor and temporary when measured by nearest noise sensitive receptors; no violations of local noise control requirements are anticipated. Noise levels of additional activities will not exceed existing conditions. Noise from dredging and ATON relocation activities could result in short-term displacement of seabirds and shorebirds that will resume normal use of foraging and roosting areas when project is completed. Underwater noise impacts are expected to be minor for marine mammals given shallow water depths, soft bottom conditions, and well-documented avoidance behaviors of animals.	
Hazardous, Toxic, and Radioactive Waste (HTRW)	No change from existing conditions. Existing pipelines for crude oil transport will remain in place. Approved and regulated facilities will continue to handle HTRW.	No hazardous materials will be released as a result of the proposed action. Landward facilities will not be affected by the proposed project and any HTRW sites have been remediated or require no additional remediation. Locations of pipelines crossing the channel are documented and approved spill response and other safety measures will be implemented to avoid risks in the unlikely event of spills or leaks.	
Water Quality	No changes to existing conditions anticipated. Any existing vessel-associated contamination would continue, consistent with the present level of vessel activities and channel maintenance.	Temporary impacts to water quality (temperature, salinity, dissolved oxygen (DO), total suspended solids) are anticipated during dredging and subsequent dredged material placement due to water column mixing. Appropriate control measures would limit these temporary impacts. Permanent effects on water temperature are expected in dredged areas given the correlation between water depth and temperature. Temporary decrease in DO and increase in total suspended solids levels are expected during dredging operations, similar to that associated with existing dredging activities. Some water samples exceeded guidance quality criteria, but the existing 4-hour, 318-fold dilution factor adequately reduces the potential impacts of these substances.	
Sediment Quality	No changes to existing conditions anticipated. Any existing vessel-associated contamination would continue, consistent with the present level of vessel activities and channel maintenance.	Lead and dioxin in some sediment samples exceed criteria levels. Exceeded dioxin Toxicity Equivalency Quotient (TEQ) values were attributable to the least toxic congener, indicating little likelihood of adverse impacts of dioxin congeners in sediments. Prior to placement of dredged material, concurrence with the EPA is needed as to whether or not these findings meet guidance for the Limiting Permissible Concentration (LPC) for lead and dioxin congeners in sediments.	
Freshwater Aquatic, Wetland, and Terrestrial Plant Communities	No changes to existing conditions are anticipated. Maintenance dredging would continue. The distribution of these communities is limited primarily to the barrier islands and associated shallow waters outside the project area.	Benefits to islands and barrier drifts are anticipated due to supplementation of littoral drift with dredged materials suitable for beneficial use at LZA. Preferred Alternative will provide 125,000 cy of material for beneficial use at the LZA site. Because aquatic, wetland, and terrestrial plant communities are absent from the project area, no direct impacts to these organisms are anticipated.	Similar benefits to islands and barrier drifts are similar to those under the Preferred Alternative. However, Alternative 2 will provide 315,000 cy of material. Because aquatic, wetland, and terrestrial plant communities are absent from the project area, no direct impacts to these organisms are anticipated.
Marine Aquatic Communities	No changes to existing conditions are anticipated. Temporary impacts of continued maintenance dredging (e.g. temporary effects of benthic organism burial in dredge material placement sites) will continue.	Impacts to open-water communities as a result of increased turbidity during dredging will be localized around the immediate area of dredging and placement and limited to the duration of the plume at a given site, but may temporarily impact localized primary production levels, finfish foraging and distribution patterns, and filter feeder filtering rates. There would be a permanent conversion of 87.6 acres of shallow habitat to deeper habitat and temporary burial of benthic organisms in placement sites. No long-term effects on benthic organisms are expected due to motility, rapid recovery of benthic communities following temporary, short term impacts in the immediate vicinity of the area dredged. No long-term turbidity impacts on artificial reefs are anticipated because of their distance from the proposed project area.	
Fish and Wildlife	Temporary impacts of existing maintenance dredging and disposal will continue and include temporary disruption of fish distribution patterns.	Permanent conversion of 87.6 acres of shallow habitat to deeper habitat. Short-term turbidity increase during construction and placement of dredge material may temporarily impact fisheries species (including recreational and commercial species), associated prey, and success of foraging bird species that dive or plunge for food. Could cause temporary impact on nesting and roosting behavior during dredge material placement. Species should return once project is complete. Temporary disruption of fish and wildlife during dredging is anticipated but no long term impacts expected. Potential temporary reduction in quality of Essential Fish Habitat (EFH) and displacement of individual species; no contamination issues or significant impacts to federally managed species. No contamination issues anticipated from beneficial use of sediments.	

Table ES-1, cont'd

<table>
<tr><th>Resource</th><th>No-Action Alternative</th><th>Preferred Alternative</th><th>Alternative 2</th></tr>
<tr><td>Threatened and Endangered Species</td><td>No changes to existing conditions and no significant adverse impacts are anticipated under existing conditions. Any displaced animals would be expected to resume normal use of the area following maintenance dredging.</td><td colspan="2">Temporary changes include underwater noise caused by dredging and placement of sediments, potential changes to DO, turbidity, sediments, and predator/prey dynamics for benthic feeders.
Potential temporary displacement of West Indian manatee, Gulf Sturgeon, Alabama shad, bald eagle, brown pelican, Mississippi sandhill crane, and piping plover may occur. Migration windows for construction will be recognized to avoid potential harm during sturgeon migration.</td></tr>
<tr><td>Sea Level Rise/
Climate Change</td><td>Continued rapid land loss from barrier island s is anticipated as a result of rising sea level, frequent intense storms, and reduced sediment supply.
Continued trends in greenhouse gas emissions. Continued effects of sea level rise (SLR), including erosion, reduced sediment supply, and more frequent and intense storms, are also anticipated.</td><td colspan="2">Addition of dredged materials for beneficial use (125,000 cy with Preferred Alternative and 315,000 cy with Alternative 2) would supplement sediment budgets in project area and ameliorate continued land loss and shifts associated with barrier islands. Alteration of longshore sediment delivery across the channel may increase vulnerability of coastal barrier islands, specifically Horn Island.
Greenhouse gas (GHG) emissions associated with dredging activities and on-road vehicles as part of the proposed project would be so small as to be a negligible consideration. The main potential source of GHG emissions would be the loss of carbon sequestered in the ecosystem. Increases in GHG can exacerbate existing effects of SLR, including erosion, reduced sediment supply, and increased occurrence and intensity of storm events, which in turn may require additional maintenance dredging in channels. Addition of dredged materials for beneficial use would help reduce continued land loss and shifts associated with barrier islands by supplementing sediment budgets in project area. Alteration of longshore sediment delivery across the channel may increase vulnerability of coastal barrier islands, specifically Horn Island.</td></tr>
<tr><td>Cultural Resources</td><td>No additional impacts anticipated, as no new activities would occur (maintenance dredging would continue). Adverse impacts to existing in situ burials and remaining portions of sites 22JA516 and 22JA618 would continue. Anticipated impacts to cultural and archaeological resources will require mitigative actions developed through a Memorandum of Agreement between the Mississippi Department of Archives and History, USACE, and Advisory Council for Historic Preservation.</td><td colspan="2">Anticipated impacts to cultural and archaeological resources will require mitigation actions developed through a Memorandum of Agreement between the Mississippi Department of Archives and History, USACE, and the Advisory Council for Historic Preservation. According to the USACE Mobile District, there is not currently an MOA or formal burial treatment plan in place. The USACE Mobile District has proposed a draft work plan for the archaeological Phase III data recovery of the 22JA516 archaeological site if the site cannot be avoided as part of the proposed project. The draft work plan contains environmental and site-specific cultural overviews, an overview of completed cultural resources work at the site, a research design, Phase III archaeological methods, laboratory and specialized analysis methods, methods to curate materials, public interpretation/education, USACE-prepared Plan for the Treatment of Human Remains, and a project schedule. The USACE Mobile District has also initiated consultation with the MDAH and interested federally recognized Native American tribes.</td></tr>
<tr><td rowspan="2">Land Use</td><td rowspan="2">No change to land use, utilities, public safety, transportation or parks, recreational areas or other community facilities is anticipated.</td><td colspan="2">No adverse impacts anticipated. Reduced transit restrictions are expected to increase the efficiency of Port and channel activities, maintain the safety of vessels transiting the Port and may help to improve the economy by providing more opportunities at the Port. No increase in ground traffic is anticipated. No impacts to utilities or parks, recreational areas or other community facilities are anticipated.</td></tr>
<tr><td>Widening along only the west side of the existing channel will not affect existing marine terminals at the Port.</td><td>Widening along the east and west sides of the existing channel will locate the channel closer to existing marine facilities.</td></tr>
<tr><td>Socioeconomics</td><td>No changes to existing conditions without the proposed project. Current and projected population trends would continue, and increases in population following the post-Katrina decline are anticipated.</td><td colspan="2">Beneficial effects of the proposed project include temporary increase in jobs and migration of workers and associated demand for temporary housing and spending of disposable income. Vessel transits are not anticipated to increase beyond that anticipated under the No-Action Alternative; however, increased efficiencies would result in reduced operating costs for vessel operators and greater availability of marine terminals, which would be an economic benefit for the vessel operators and/or marine terminal.</td></tr>
</table>

1.0 INTRODUCTION, PURPOSE, AND NEED

1.1 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Mobile District, Regulatory Division, has prepared this Environmental Impact Statement (EIS) to assess the potential environmental impacts associated with the proposed project, also referred to as the Bayou Casotte Harbor Improvement Project (BCHIP). Under the proposed project, the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment of Pascagoula Harbor would be widened by 100 feet and excavated as necessary to a depth consistent with the existing channel, and the northern portion of the Horn Island Pass Channel would be widened as necessary to facilitate (ease) the transition between the two channel segments. Included in the evaluation is the beneficial use and placement of dredged material.

The EIS is intended to be sufficient in scope to address Federal, state, and local requirements with respect to the proposed project activities and permit approvals, and to address requirements under the National Environmental Policy Act (NEPA) of 1969.

1.2 REGULATORY AND PLANNING DIVISION PROCESSES

USACE is evaluating the Jackson County Port Authority (JCPA)/Port of Pascagoula (Port) application for a Department of the Army permit under Section 404 of the Clean Water Act (CWA), Section 10 of the Rivers and Harbors Act (RHA) of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act (MPRSA). A joint public notice for the permit application (SAM-2011-00389-PAH) was issued by the USACE on April 15, 2011. Based on the permit application submitted by the Port, the USACE determined that the permitting action for the proposed dredge and fill activities constitutes a major Federal action. In accordance with NEPA, this EIS has been prepared to analyze and disclose the potential impacts of the proposed project and associated reasonable alternatives on the natural and human environment. The USACE is the lead Federal agency for the preparation of this EIS in compliance with the requirements of NEPA and the President's Council on Environmental Quality (CEQ) regulations for implementing NEPA (Title 40 Code of Federal Regulations [C.F.R.] Parts 1500 to 1508 [40 C.F.R.]). The action requires compliance with Section 404 of the CWA for the discharge of dredged or fill material into waters of the United States, including a Section 404(b)(1) analysis to help ensure compliance. This EIS was prepared in support of the regulatory process for the specific permit application and proposed project. The proposed Federal action is the issuance of a permit to dredge or excavate adjacent to a Federal Navigation Channel in or affecting navigable waters of the U.S. The EIS evaluates potential impacts on the human environment from proposed channel widening activities and the placement of dredged material in an Ocean Dredged Material Disposal Site (ODMDS) and the designated Littoral Zone Area (LZA) east and south of Horn Island that could be suitable for beneficial use. The USACE may ultimately make a determination to approve the permit, approve the permit with conditions, or deny the permit for the above project.

The regulatory EIS will also support non-Federal construction of the project. A separate Civil Works EIS and Feasibility Study are being prepared concurrently by the USACE Planning Division to evaluate whether there is a Federal interest in assuming maintenance of the widened channel. It is anticipated that the excavated area (or channel improvements) would become part of the Federal Navigation Channel and that the Federal government would assume maintenance of the widened channel (pending approval of the USACE Civil Works EIS). The outcome of the Civil Works EIS will determine whether the Federal government will assume maintenance responsibilities for the widened portions of the channel.

The Port requested the USACE conduct a Feasibility Study of the Bayou Casotte Harbor Channel Improvement Project in Fall of 2008 under authority of Section 204 of the WRDA of 1986 [Public Law (PL) 99-662; 33 U.S.C. 2232, as amended], which authorizes the review of water resources projects, primarily flood control and navigation projects, to determine the need for modifications in the structures and operations of such projects for the purposes of improvement of the quality of the environment. The Civil Works EIS is in progress.

1.3 USACE REGULATORY PUBLIC INTEREST REVIEW PROCESS

The concept of public and private need for the proposed action is important to the balancing process of the USACE public interest review (33 C.F.R. 320.4(a)). A private applicant’s proposal may satisfy both a public and a private need (e.g., providing the public with needed goods and services). A public sector applicant’s project is presumed to address some public need, such as public recreation. With regard to private projects, Department of the Army regulations (33 C.F.R. 320.4 (q)) state that the USACE will generally not concern itself with the question of whether a proposed project will earn a profit or become economically viable, or whether it is needed in the market place. In regard to public projects, the USACE can defer to a state or other government entity decision to spend non-Federal public money. However, regulations require that the USACE make an independent review of the public need for a project from the perspective of the overall public interest. This independent review is relevant to the USACE permit decision. The USACE will question the public need for a project if the proposed project appears to be unduly speculative. In the public interest review, the USACE has the responsibility to balance public interest need or benefits against public interest detriments. The decision of whether to authorize a proposed project and the conditions under which it will be allowed are determined by the outcome of this general balancing process, primarily as it relates to navigation. This EIS provides the basis of the public interest review process undertaken by the USACE.

1.4 PURPOSE AND NEED

As stated by the Applicant, the purpose of the proposed project is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the turning basin in Bayou Casotte, alleviate current vessel transit restrictions, and increase travel efficiencies for vessel transit. The current width of the channel imposes transit limitations for marine vessel traffic that delays vessels and fosters inefficient use of the channels and harbor. The proposed project is intended to:

- Reconfigure the channel to alleviate the current transit restrictions and increase travel efficiencies for vessel transit.
- Improve conditions for Port operations.
- Maintain or improve the current level of safety for vessel operations under the improved conditions.

The proposed project is needed to reduce present transit restrictions along Pascagoula Lower Sound and Bayou Casotte navigation channel. The existing federally authorized channel dimensions restrict deep-draft vessels to one-way traffic, restrict vessels greater than 700 feet length overall (LOA) or draft greater than 36 feet to daylight travel, and impose restrictions on travel due to wind and current conditions. Estimates by Hackett (2003) for Gulf Coast ports indicate an expected annual increase in tanker calls of 1.9 percent and dry bulk calls of 2.0 percent.

- Economic pressure and technological advances have generally resulted in a trend towards production of larger ships, which has increased channel improvement needs. A significant overall increase in demand for shipping is projected due to globalization and large increases in commodity trade (Hackett 2003). The existing fleet will grow, and newer ships will likely be larger in pursuit of economic efficiency (Waters et al. 2000). The proposed project will reduce existing channel and harbor restrictions, thereby improving operating conditions and efficiency in the channel and harbor. Specific benefits anticipated as a result of the proposed project are listed below. Transit during dark hours for crude oil tankers (in ballast) and Panamax bulk carriers.
- Transit of liquefied natural gas (LNG) tankers during higher wind and current conditions than present conditions permit.
- Two way traffic under established conditions and criteria.
- Improved terminal operations and increased production hours due to decreased number of delays.

No new facilities or vessel traffic are dependent upon the proposed project and no increase in vessel traffic is expected to result from the channel widening alternatives. However, increased growth and vessel traffic are anticipated as a result of continued economic recovery following Hurricane Katrina. Both the Pascagoula River Harbor and Bayou Casotte Harbor are densely developed with little property available for development of new deep-draft marine terminals.

Statistically, traffic is expected to increase, but that increase will be driven by increased capability, demand, or utilization of existing facilities, not by the availability of a wider channel. The proposed project will increase the ability of the Port to handle current and future marine vessel traffic in an economical and efficient manner.

In addition to the NEPA-required purpose and need discussed above, the 404(b)(1) Guidelines require that the USACE define the "basic project purpose" and the "overall project purpose" to evaluate appropriate alternatives. The basic purpose is the most simple or irreducible objective of the project and is used to determine whether the Applicant's project is "water dependent" (40 C.F.R. 230.10(a)(3)). The water dependency test contained in the 404(b)(1) Guidelines creates a presumption that activities that do not require access to, proximity to, or siting within special aquatic sites to fulfill their basic project purpose are not water dependent. Therefore, the 404(b)(1) Guidelines state that practicable alternatives to non-water dependent activities are presumed to exist, are less damaging, and are environmentally preferable to alternatives that involve discharges into special aquatic sites (e.g., wetlands) (40 C.F.R. 230.10(a)(3)). The basic purpose of this project would be to expand an existing ship navigation channel and is considered a water-dependent activity.

The USACE must also define the overall project purpose. The overall project purpose establishes the scope of the alternatives analysis and is used for evaluating practicable alternatives under the 404(b)(1) Guidelines. In accordance with the 404(b)(1) Guidelines and guidance from USACE Headquarters (HQUSACE), the overall project purpose must be specific enough to define the Applicant's needs, but not so narrow and restrictive as to preclude a proper evaluation of alternatives. The USACE is responsible for controlling every aspect of the 404(b)(1) Guidelines analysis (HQUSACE 1989). In this regard, defining the overall project purpose for issuance of USACE permits is the sole responsibility of the USACE. While generally focusing of the Applicant's purpose and need statement, the USACE will, in all cases, exercise independent judgment in defining the purpose and need for the project from both the Applicant's and the public's perspectives (33 C.F.R. Part 325; 53 Fed. Reg. 3120). The overall purpose of the proposed project would be to improve operating conditions and efficiency in the Pascagoula Lower Sound and Bayou Casotte channels and Bayou Casotte Harbor.

1.5 SCOPE OF THE DOCUMENT AND ENVIRONMENTAL ANALYSIS

This EIS was developed in accordance with NEPA and implementing regulations issued by the CEQ (40 C.F.R. Parts 1500–1508); and USACE implementing regulations under 33 C.F.R. Part 325, Appendix B. The purpose of this EIS is to inform decision makers and the public of the likely environmental consequences of the proposed action and alternatives.

This EIS identifies, documents, and evaluates potential effects of widening the Pascagoula Lower Sound/Bayou Casotte Federal Channel and placement of new work dredged material on the natural and human environment An interdisciplinary team of scientists, planners, economists, engineers, archaeologists, and historians has analyzed the proposed action and alternatives with respect to existing conditions in the study area and identified relevant beneficial and adverse effects associated with the action. The permit application evaluated in this EIS includes widening portions of the existing Federal Navigation Channel. The proposed project does not include increasing the depth of the channel.

This EIS is prepared for the USACE Regulatory Process for the permit application received from the Port. As described previously, the Federal assumption of maintenance under Section 204(f) is being addressed in a parallel Civil Works EIS. For the purpose of this EIS, it is assumed that maintenance dredging would be conducted by the Federal government. Federal assumption of maintenance dredging of the Lower Sound/Bayou Casotte Federal Navigation Channel segment of Pascagoula Harbor is addressed in Section 5, Cumulative Impacts, of this EIS and is not part of the alternatives analysis.

The National Marine Fisheries Service (NMFS) and U.S. Coast Guard (USCG) are cooperating agencies for the preparation of this EIS. A cooperating agency has jurisdiction by law or special expertise with respect to environmental impacts involved with the proposal, and is involved in the NEPA analysis. Additional agency (and public) coordination is discussed in Section 12 of this EIS.

1.6 DESCRIPTION OF PROPOSED PROJECT

The proposed project evaluated in this EIS is the dredging of approximately 38,200 linear feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Navigation Channel segment to widen the channel from the federally authorized width of 350 feet and depth of –42 feet mean lower low water (MLLW) (with 2 feet of allowable overdepth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline, and to the existing federally authorized depth of –42 feet MLLW The proposed project would include placement of the dredged material resulting from the channel modification (referred to as new work dredged material). As described previously, potential impacts associated with future maintenance are addressed in Section 5, Cumulative Impacts, of this EIS, and in the Civil Works EIS. Project alternatives are described in section 2.3.1.

1.7 STUDY AREA AND PROJECT AREA

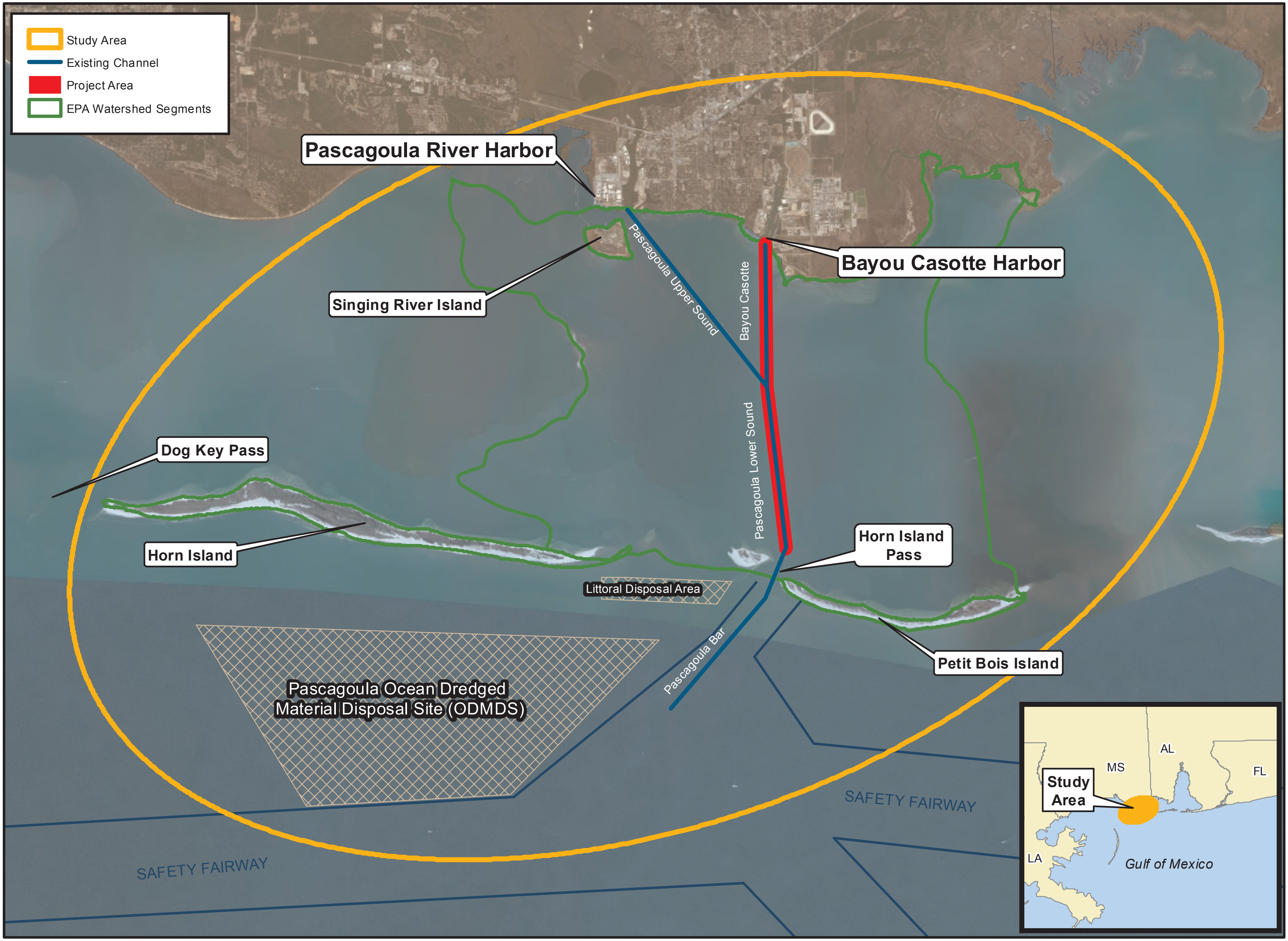
The Port of Pascagoula is located in southeastern Mississippi on the Mississippi Sound in/adjacent to the City of Pascagoula in Jackson County, Mississippi, south of Interstate Highway 10 and U.S. Highway 90. The Mississippi Sound extends from Lake Borgne, Louisiana, to Mobile Bay, Alabama, and is geographically separated from the Gulf of Mexico by a series of narrow islands and sand bars. The Bayou Casotte Harbor and Pascagoula River Harbor are accessible via navigation channels that are part of the Pascagoula Navigation Project, which extends approximately 18 miles offshore from the Port. The Pascagoula Navigation Project enters the Mississippi Sound from the Gulf of Mexico, passes between Horn Island and Petit Bois Island, crosses the Gulf Intracoastal Waterway (GIWW) and then branches into two channel segments that provide access to the Bayou Casotte and Pascagoula River harbors. The eastern channel leads to the Bayou Casotte Harbor and the western channel leads to the Pascagoula River Harbor. The proposed project encompasses the Pascagoula Lower Sound and Bayou Casotte channel that extends from the northern limit of Horn Island Pass to the Bayou Casotte Harbor south of the turning basin.

A study area was defined to represent the area of resources potentially and indirectly affected by the proposed project (Figure 1.7-1). The study area for a specific resource, if different from Figure 1.7-1, will be defined in the section describing the existing conditions for that resource (Section 3). The study area for this EIS is based on and includes:

- Relevant watershed segments established by the U.S. Environmental Protection Agency (EPA), Office of Water (Pointe aux Chenes Bay, Horn Island, Petit Bois Island, and Singing River Island in Mississippi Sound)
- Extent of sediment plumes and effects of local currents (Johnson et al. 2010, Vinogradova 2005)

The project area is a subset of the study area, and is represented by the existing channel footprint and proposed alternatives. The project area defines the area of direct impacts on the resources addressed that may be anticipated as a result of the alternatives, is defined by the areas listed below, and is shown in Figure 1.7-1.

- Pascagoula Lower Sound/Bayou Casotte Federal Navigation Channel segments proposed for widening
- A buffer of 1,000 feet to include Mississippi Department of Environmental Quality (MDEQ) recommendations for mixing zones (750 feet)
- Potential dredged material placement sites
  - LZA (south and east of Horn Island)
  - Pascagoula ODMDS



US Army Corps of Engineers Mobile District

Figure 1.7-1

Project and Study Area

Bayou Casotte Harbor Channel Improvement Project

0 2.5 5 Miles

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2.0 DESCRIPTION AND EVALUATION OF ALTERNATIVES

2.1 INTRODUCTION

The Port of Pascagoula is the largest seaport in the state of Mississippi, moving over 35 million tons of cargo on an annual basis. As described previously, the proposed project addressed by this EIS includes widening the Lower Sound/Bayou Casotte Federal navigation channel to alleviate existing transit restrictions on vessels using the Port.

In accordance with NEPA (32 C.F.R. 1502.14), the alternatives section is the heart of the EIS, identifying the alternatives considered, explaining why certain options were eliminated from further consideration, and evaluating potential impacts to identify the environmentally preferred alternative. Based on the information and analyses presented in the Affected Environment and the Environmental Consequences sections (sections 3 and 4, respectively), the environmental impacts of potential alternatives are compared, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public. The alternatives analysis includes an evaluation of reasonable alternatives, including the No-Action Alternative. Some alternatives are discussed and eliminated from detailed study; other alternatives are considered in detail in the EIS.

As a result of the decision process, the USACE may issue the permit, deny the permit, or issue the permit with modifications or conditions. The No-Action Alternative is, in effect, equivalent to denial of the permit by the USACE. While alternate sites would be considered alternatives for some projects that address a national or statewide-need, the present permit application is for the Port of Pascagoula only. Therefore, the types of alternatives addressed in this EIS are widening alternatives and dredged material placement alternatives. No reasonable cost effective options for diverting commodities or production from the Port to other facilities in the U.S. have been identified at this time. Industries that use the Port of Pascagoula have invested in specialized features to handle their commodities (e.g., Chevron Refinery and Mississippi Phosphates Corporation [MPC]).

2.2 ALTERNATIVES SCREENING CRITERIA

Screening criteria are used to narrow the field of possible alternatives. Criteria can be used to eliminate alternatives and/or choose between similar alternatives. Alternatives that are not eliminated here are analyzed further in this EIS. Screening criteria were developed to evaluate alternatives with respect to meeting the purpose and need of the project. These include modifications to the existing navigation channel to reduce vessel transit restrictions with the least adverse environmental effect. These criteria require alternatives to be compatible with navigation needs and consistent with the requirements of the vessels using the channels and Port and provide a plan for the placement of new work dredged material. Existing available data and information prepared specifically for this project included, but was not limited to, salinity model data, ship simulation study results, aerial photography, historical dredging records, and previously prepared scientific and engineering reports relevant to the proposed project and study/project area.

Criteria were developed to identify alternatives that are feasible, reasonable, and should be considered in detail. These criteria are outlined below and described in the sections that follow to specifically address channel widening and dredged material placement with respect to environmental considerations (including the human environment).

- **Channel widening**. The alternative provides a means of reducing existing vessel transit restrictions at the Port of Pascagoula while maintaining the current level of safety (i.e., meets purpose and need), and:
  - The alternative has acceptable impacts on other project uses (such as the shipping industry and recreational users)
  - The alternative results in the least environmental impact
  - The alternative increases the ability to accommodate larger ships under a wider range of weather conditions and increases the transit efficiency of other vessels
- **Dredged material management**. The alternative results in environmental benefits or in minimal adverse environmental impact, for example:
  - Beneficial use of dredged material:
    - Potential habitat restoration opportunities associated with beneficial use of dredged material
    - Agency preference of beneficial use over open-water disposal due to habitat benefits
  - Agency preference for placement of dredged material at the existing ODMDS versus placement in open-water disposal areas in the Mississippi Sound to minimize habitat impacts
  - Constraints of upland placement associated with transportation costs

2.2.1 Channel Widening

Channel widening criteria included adequate width to safely and effectively reduce existing vessel transit restrictions and minimize potential environmental impacts of dredging. The Lower Pascagoula Sound/Bayou Casotte Federal navigation channel is currently maintained at –42 feet MLLW (with 2 feet of allowable overdepth and 2 feet of advanced maintenance). Present transit restrictions include one-way only and daylight only traffic due to channel width restrictions and weather conditions. For example, high wind and/or strong currents can require ships to remain at dock or at the sea buoy due to increased risk of vessels not maintaining channel alignment, particularly at Horn Island Pass and the transition from the Lower Pascagoula Channel to Bayou Casotte Channel.

Vessels greater than 700 feet LOA or beam exceeding 125 feet or draft greater than 36 feet are limited to daylight transit. Drill rigs with a beam greater than 300 feet are not recommended. In addition, winds approaching 30 knots and/or seas 10 to 12 feet require that vessels will be handled on a case-by-case basis. Drill rigs are limited in transit to winds 15 knots or less. Vessels over 785 feet LOA or 125 feet beam shall also be considered on a case by case basis, require prior approval from the Port Authority, and may be required to have two pilots during transit. A vessel that has made three port calls may be exempt from some or all of these restrictions, subject to review by the pilots (Pascagoula Bar Pilots Association 2004).

The greatest transportation cost savings for these vessels are achieved by reducing these transit restrictions. In addition, an increase in channel width would maintain the level of safety under improved conditions and allow two-way and night transit in some instances. The selection of channel alternatives therefore considered a range of increases in channel widths on either and both sides of the channels. Based on the dimensions of existing and potential vessels using the Port, a series of channel widening alternatives was developed to safely accommodate a range of vessels.

Nine channel widening alternatives are being evaluated in the concurrent USACE Civil Works EIS. These alternatives are considered in this Regulatory EIS as a preliminary array of alternatives, and include:

- 150 feet on west side of channel
- 150 feet on east side of channel
- 100 feet on west side of channel (Applicant's Preferred Alternative)
- 100 feet on east side of channel
- 50 feet on west side of channel
- 50 feet on east side of channel
- 25 feet on each side of channel
- 50 feet on each side of channel
- 75 feet on each side of channel

2.2.2 Vessel Simulation Study Results

Vessel simulations using models that accounted for ship dynamics, area weather, and bay hydrodynamics, were conducted for both the existing channel configuration and the potential alternatives for improvements to the Pascagoula Lower Sound/Bayou Casotte Federal Channel. Ship captains, pilots, and ships officers and helmsmen, representatives from the Pascagoula Bar Pilots Association, tug experts, representatives from Maritime Simulation Institute (MSI) and Moffat & Nichol International, and various subject matter experts were part of the development and validation of the geographic and hydrographic models and the execution of simulations for the potential improvements. All simulations were completed by the MSI, formerly known as the Marine

Safety International's Training and Simulation Center in Newport (Middletown), Rhode Island. The Vessel Maneuvering Simulations Report is provided in Appendix A.

The purpose of the simulations was to conduct a series of real-time maneuvering simulations to evaluate the winds, waves, tides, currents and visibility of the one-way navigation channels leading to and from the Gulf LNG Energy (GLE) Terminal located on the Bayou Casotte navigation channel. The simulations were conducted using a 954 feet LOA, 142.5 feet beam gas carrier. A variety of weather conditions were simulated using winds of up to 20 knots with gusts and varying current velocity profiles up to one knot and included both flood and ebb tides. Up to four 60-ton bollard pull Azimuth Stern Drive tractor tugs were used in the simulations. It should be noted that the useable width of the channel when transited by the simulated carrier and associated tugs is reduced, due to the additional width of the tugs outboard of the vessel, by 50 feet. A total of 116 vessel simulation runs were conducted over the 3-year period. Simulations were considered successful when the vessel navigated its course with little or no deviation from its anticipated track, or stayed within a minimum of 100 feet from a fixed object in the berth maneuvering area or 50 feet from the edge of the navigation channel.

The design vessel on which ship simulation and channel widths were based was approximately 950 feet LOA, had a beam of 155 feet, and a draft of approximately 39 feet, similar to the typical LNG vessels that have called on the Gulf LNG terminal. The typical dredging area and depth, or "prism," for each channel alternative included 5 horizontal to 1 vertical side slopes and additional 2 feet of depth for advanced maintenance and 2 feet for allowable overdepth excavation on the main channel and turning basin. The key locations at which improvements are needed, based on vessel simulation results and pilot recommendations are listed below.

- North of Horn Island Pass for bend "easing" into the Pascagoula Lower Sound Channel
- Intersection of the Lower Pascagoula Channel with the GIWW
- Y-intersection of the Pascagoula Lower and Upper Sound Channels and Bayou Casotte Channel

Based on simulation results, debriefing discussions following simulation runs, evaluations of vessel track plots, and pilot recommendations, widening the channel 100 feet to the west and easing the Horn Island Pass bends were found to provide the most effective improvements to increase the availability of the channel for vessel transit under a much wider range of environmental conditions than the existing channel. The 100-foot widening to the west increases the radius of the turn from Horn Island Pass Channel to the Lower Pascagoula Channel, and increases the radius of the available turning area at the entrance to the GLE dredged slip. A 500-foot channel model was evaluated during some simulations; however, a 450-foot-wide channel provides the necessary improvements to increase channel availability under a much broader range of operating conditions with a lesser environmental impact and cost.

2.2.3 Dredged Material Management

The general environmental criteria for navigation projects are identified in Federal environmental statutes, executive orders, and planning guidelines. National policy requires fish and wildlife resource conservation be given equal consideration with other study purposes in the formulation and evaluation of alternatives. Thus, care was taken to preserve and protect significant ecological, cultural, and natural resources. In developing and considering alternatives, particular emphasis was placed on:

- Protection and preservation of the existing fish and wildlife resources, including estuaries, wetland habitats, and water quality, and improvement of these resources by the use of dredged material for beneficial use for creation and/or protection of habitat
- Consideration in the project design of the least disruptive construction techniques and methods
- Preservation of significant historical and archaeological resources through avoidance of impacts.

New work material would be generated in areas that have not been previously dredged; maintenance material would be obtained from areas where dredging has occurred and sedimentation has affected the approved channel depths or widths. The new work and associated maintenance material for the existing channel would have different physical characteristics, with differing effects on the environment resulting from disposal activities. Once material has been removed from the channel, it must be managed, placed, or disposed of, in an approved manner. Options for placement of material include:

- Beneficial use of material (e.g., placement in the LZA) and/or placement in beneficial use sites
- Placement in designated ODMDS
- Placement in designated or new upland confined placement areas

Material selected for beneficial use (including placement in beneficial use or other sites) must meet criteria established by the EPA in Title 40 C.F.R., Parts 220–228, for the chemical and physical characteristics of the sediments. Options for beneficial use provide opportunities for habitat restoration and therefore require careful review, assessment, and evaluation to minimize any potential negative effects of sediment placement in an aquatic or wetland environment. Dredged material with sand content suitable for beneficial use would provide material for habitat restoration activities in shallow nearshore waters (−14 feet to −22 feet MLLW). Granular and sandy materials are appropriate for beach nourishment, parks, turtle nesting beaches, bird nesting islands, wetlands restoration and/or establishment, and many other applications. Dredged material with appropriate sand content may also be placed in the LZA and would increase the amount of sediment (particularly sand) transported along the coast at an angle to the shoreline (also known as littoral drift), thereby helping to restore the sands deposited to the barrier islands via littoral currents.

EPA-designated ODMDSs could be used as placement sites for dredged material when beneficial use is not a viable option. The Pascagoula ODMDS is located just south of Horn Island. The site is bound by Horn Island to the north, the Pascagoula Harbor Navigation Channel to the east, the navigation safety fairway to the south, and a north-south line running through Dog Keys Pass to the west (Figure 1.7-1). The Pascagoula ODMDS ranges from depths of about –38 feet in its northern portion to over –52 feet in its southern portion. Placement of dredged material at the ODMDS is restricted to depths below –20 feet MLLW. The site is considered to be dispersive (i.e., the deposited material is dispersed during storms or strong current activity). The coordinates of the center of the site are 30°10'09"N and 88°39'12"W. The Pascagoula ODMDS was intended to be used for maintenance and new work material from the Pascagoula Harbor Navigation Channel by private entities, such as the Port, Huntington Ingalls Ship Systems Ingalls Operations, and the Chevron Refinery (EPA and USACE 2006). Evaluation oversight is provided by the USACE, as they are the permitting agency for the transport of dredged material under MPRSA Section 103, and the sediment evaluations and testing are subject to EPA review and concurrence.

Upland confined placement areas are usually designated for use by certain entities and have specific capacity limits. Placement of dredged material in such areas can be cost-prohibitive, depending on the proximity of the placement area to the area being dredged. There are no available upland placement sites proximate to the project area.

2.3 PRELIMINARY ARRAY OF ALTERNATIVES

Potential alternatives for this project have two components, as described previously: (1) channel widening, and (2) dredged material placement. The initial array of channel widening alternatives and dredged material management are presented in this section. Alternatives consistent with the screening criteria were carried forward for further evaluation in Section 2.4. Alternatives that do not meet the screening criteria were identified and eliminated from further evaluation.

2.3.1 Channel Widening Alternatives

The channel widening alternatives were evaluated using the screening criteria discussed in Section 2.2. Table 2.3-1 provides a summary of the alternatives with respect to the project needs, identifies alternatives eliminated from further consideration, and identifies alternatives carried forward for further analyses. Alternatives were eliminated if they did not meet the screening criteria discussed in Section 2.2.

Table 2.3-1
Preliminary Array of Channel Widening Alternatives

Channel Widening Alternative	Meets Screening Criteria	Comment (shaded cells eliminated from further evaluation)
150 feet on west side of channel	No	Exceeds project need and is substantially more costly than the proposed project ($23.6M vs. $32.6 M). More extensive environmental impact when compared with 100-foot expansion. West-side widening eases turns from Horn Island Pass to the Pascagoula Lower Sound Channel and into Bayou Casotte and ship berths.
150 feet on east side of channel	No	Exceeds project need and is substantially more costly ($23.6M vs. $32.6 M). Increases environmental impact and costs when compared with 100-foot expansion. East widening places Navigation channel closer to existing marine terminals.
100 feet on west side of channel (Applicant's Preferred Alternative)	Yes	Meets project need, i.e., alleviates existing navigation restrictions at the Intersection of the Lower Pascagoula Channel with the GIWW, eases the Horn Island Pass bends, and the Y-intersection of the Lower and Upper Pascagoula Channels and Bayou Casotte Channel. Also increases availability of night transit and two-way traffic for many vessels presently using the Port. West-side widening eases turns from Horn Island Pass to the Pascagoula Lower Sound Channel and into Bayou Casotte and ship berths.
100 feet on east side of channel	No	Does not meet project need. Ship simulation results indicate impacts to west bank. Does not increase turning area available to vessels. East widening places Navigation channel closer to existing marine terminals.
50 feet on west side of channel	No	Does not meet project need. Does not increase turning radius area available to vessels. Ship simulation results indicate impacts to west bank. West-side widening eases turns from Horn Island Pass to the Pascagoula Lower Sound Channel and into Bayou Casotte and ship berths.
50 feet on east side of channel	No	Does not meet project need. Does not increase turning area available to vessels. Ship simulation results indicate impacts to west bank. East widening places Navigation channel closer to existing marine terminals.
25 feet on each side of the channel	No	Does not meet project need, i.e., does not alleviate existing vessel restrictions.
50 feet on each side of the channel	Yes	Meets project need, i.e., alleviates existing vessel restrictions by increasing available turning radius, especially at Horn Island Pass, the "Y" in the channel, and the turning basin.
75 feet on each side of the channel	No	Exceeds project need and is substantially more costly than the Applicant's Preferred Alternative ($23.6M vs. $32.6M). Greater environmental impacts relative to smaller channel widening.

Ship simulation results indicate that widening the channel by 100 feet is adequate to alleviate the majority of vessel transit restrictions with respect to daylight transit only and one way only traffic for much of the vessel traffic presently using the Port, as well as a variety of weather conditions and both flood and ebb tides. The west-side widening eases the bend from Horn Island Pass Channel into the Lower Pascagoula Channel and increases the area available to transition from the Upper Pascagoula Channel into the turning basin and berth area. The activities requested under the regulatory permit are exceeded if the channel is widened 150 feet and the cost of widening the channel by 150 feet exceeds that of widening the channel by 100 feet. Consequently, widening the channel by 150 feet has been eliminated from further consideration, as indicated by the shading of this alternative in Table 2.3-1.

Navigation considerations include the ability of a vessel to effectively navigate between channel segments during both inbound and outbound transits. Widening the west side of the existing channel maintains the navigation buffer between the channel and the Gulf LNG Energy and Chevron marine facilities, whereas widening on the east side would decrease the buffer. Additionally, because the south turning basin is located on the west side of the channel, widening on the west side provides improved access to the turning basin. Therefore, widening the channel by 100 feet on the west side is more effective than widening it on the east side. Based on this, the channel widening alternative of 100 feet on the east side was eliminated (shaded in Table 2.3-1).

The remaining two (unshaded) alternatives were considered for further evaluation (Section 2.4) along with the No-Action Alternative.

2.3.2 Dredged Material Management

The proposed project requires the placement of new work and maintenance dredged material in an environmentally acceptable and engineering and economically feasible manner. Proposed placement options include LZA and ODMDS placement. In the interest of meeting the project purpose and need while minimizing and mitigating for environmental impacts, the project Applicant met with the State and Federal resource agencies listed below to develop the Dredged Material Management Plan (DMMP). Agencies consulted regarding beneficial use of dredged material include:

- Mississippi Department of Environmental Quality (MDEQ)
- Mississippi Department of Marine Resources (MDMR)
- National Marine Fisheries Service (NMFS)
- National Park Service (NPS), Gulf Islands National Seashore
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Environmental Protection Agency (EPA)
- U.S. Army Corps of Engineers (USACE)

Beneficial use for coastal Mississippi means that material dredged from Mississippi Sound is reused in the system, as close to the dredged area as possible, rather than placing material in open water disposal sites or in upland facilities. To facilitate retention of sediments in the system, Mississippi code 9-27-61 requires dredging projects of over 2,500 cubic yards (cy) to be used beneficially if there is a designated beneficial use site. The state of Mississippi views dredged material as a potential reusable resource and that all disposal plans should include provisions for access to such resources. The appropriateness of dredged material for beneficial use is dependent upon the nature and quantity of the material required for each use.

There are no available approved beneficial use sites in the study area. Dredged material suitable for beneficial use will be placed at the LZA and the remainder will be placed at the Pascagoula ODMDS, as appropriate. Approximately 26.9 square miles of the Pascagoula ODMDS are presently available for dredged material placement. Therefore, the Pascagoula ODMDS has ample capacity to accommodate the proposed project. Dredged material quality is addressed under Section 103(b) of MPRSA and is presented in this EIS.

Alternatives developed for placement of the material dredged from channel widening are discussed in more detail in the DMMP (included in Appendix B). Each of the dredged material management alternatives was considered further for the alternatives carried forward for this EIS. Based on criteria described earlier in Section 2.2, alternatives considered for dredged material placement that have the greatest potential environmental benefits are listed below.

- Beneficial use of dredged material (with appropriate sediment characteristics) via placement in the designated LZA located south and east of Horn Island. The majority of the LZA is located within the NPS Gulf Islands National Seashore Boundary; use of the LZA for disposal would be coordinated with NPS.
- Beneficial use of dredged material (with appropriate sediment characteristics) via placement in other designated beneficial use sites in proximity to the Pascagoula Harbor Channel (e.g., Round Island, Singing River Island).
- Placement of dredged material at the designated Pascagoula ODMDS on the south side of Horn Island.
- Open water (uncontained), thin-layer disposal of dredged material at designated open-water disposal sites within the Mississippi Sound, adjacent to the Pascagoula Channel.

Several dredged material placement alternatives were eliminated from further consideration based on preferences for beneficial use of material and previous commitments to other dredging projects in the harbor. The eliminated alternatives are listed below.

- Dredged material (with appropriate sediment characteristics) via placement in beneficial use sites proximate to the Pascagoula Harbor Channel (e.g., Round Island, Singing River Island). These sites are either not yet permitted or do not have capacity for additional material (capacity is designated for other projects), or have differing material characteristics. If a beneficial use site becomes available for use prior to construction, it will be considered for placement of suitable material.

- Open water (uncontained), thin-layer disposal of dredged material at ODMDS other than the Pascagoula ODMDS. This option does not include beneficial use, and an approved site is not available (existing open-water sites adjacent to the Federal Channel are designated for existing Federal Channel maintenance material only). Approved ODMDS locations may be used when other open-water, beneficial use, or upland disposal options for dredged material are not feasible. Currently, the only approved site proximate to the project footprint is the Pascagoula ODMDS.
- Placement of dredged material (confined) at designated upland sites (contained). Currently, there are no approved upland disposal sites available for the proposed quantities in the vicinity of the proposed project. If a beneficial use site becomes available for use prior to construction, it will be considered for placement of suitable material. However, transport to upland sites would remove suitable material from the system and be cost prohibitive.

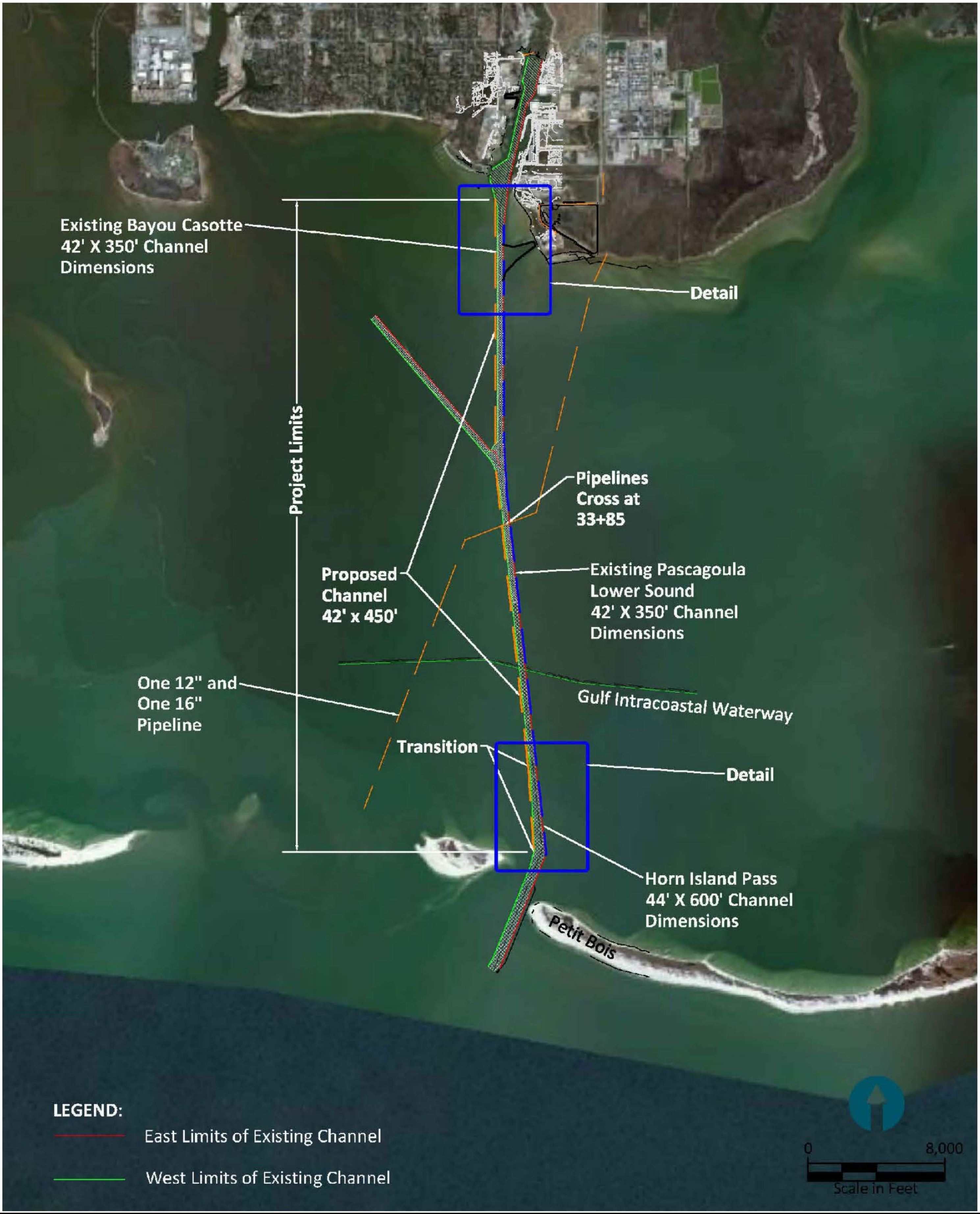
2.4 ALTERNATIVES CONSIDERED FOR FURTHER ANALYSIS

Based on the alternatives screening described above, two alternatives met the screening criteria and are carried forward in this EIS for analysis and comparison, along with the No-Action Alternative. Both of the action alternatives considered for detailed study include widening the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel an additional 100 feet. Improved channel segments would parallel the centerline of the existing channels and would be approximately 7.2 miles in length (Figure 2.4-1). Both alternatives would include authorized advanced maintenance and allowable overdepth excavation consistent with the depth of the Federal Project. Channel slopes would have 1:5 slopes and excavation would be performed hydraulically. Under both alternatives, less than 10 percent of the new work material would be predominantly sand and therefore suitable for beneficial use (Anchor QEA 2012). Aids to navigation (ATON; e.g., USCG beacons and centerline ranges) would require relocation under both the action alternatives.

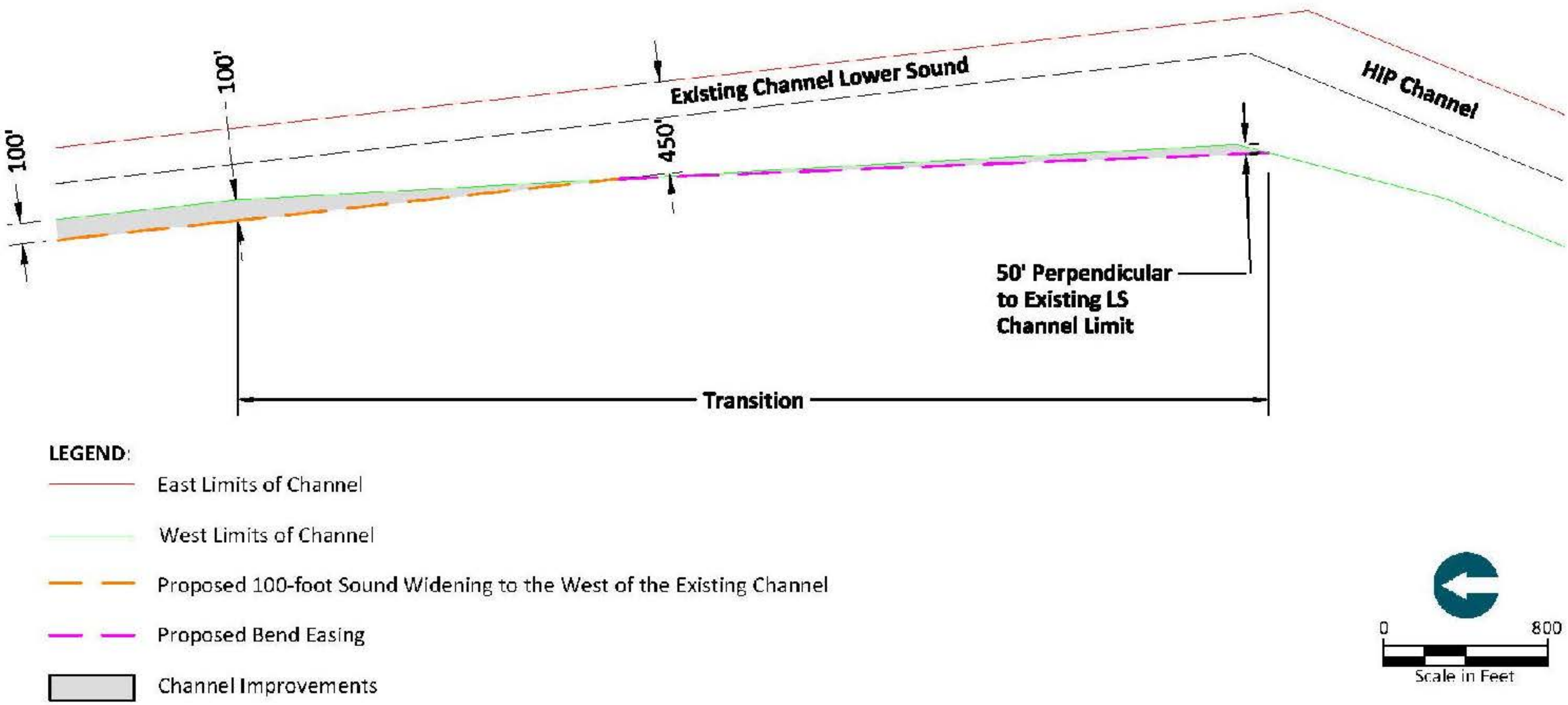
Per NEPA requirements, the No-Action Alternative is considered further as part of the analysis of environmental impacts. The No-Action Alternative includes the “future without project” conditions and will be used for comparison with the Preferred Alternative and Alternative 2, both of which address potential “future with project” conditions. The full analysis of these alternatives is presented in Section 4, Environmental Consequences.

2.4.1 No-Action Alternative

The No-Action Alternative represents the future without project condition to compare to the final array of alternatives. Under the No-Action Alternative, the Bayou Casotte and Pascagoula Lower Sound channels would remain at present federally authorized widths and depths:



US Army Corps of Engineers Mobile District — Figure 2.4-1 Sheet 1 of 4	**Proposed Channel Widening Alternatives** (Source: Anchor QEA)	Bayou Casotte Harbor Improvement Project



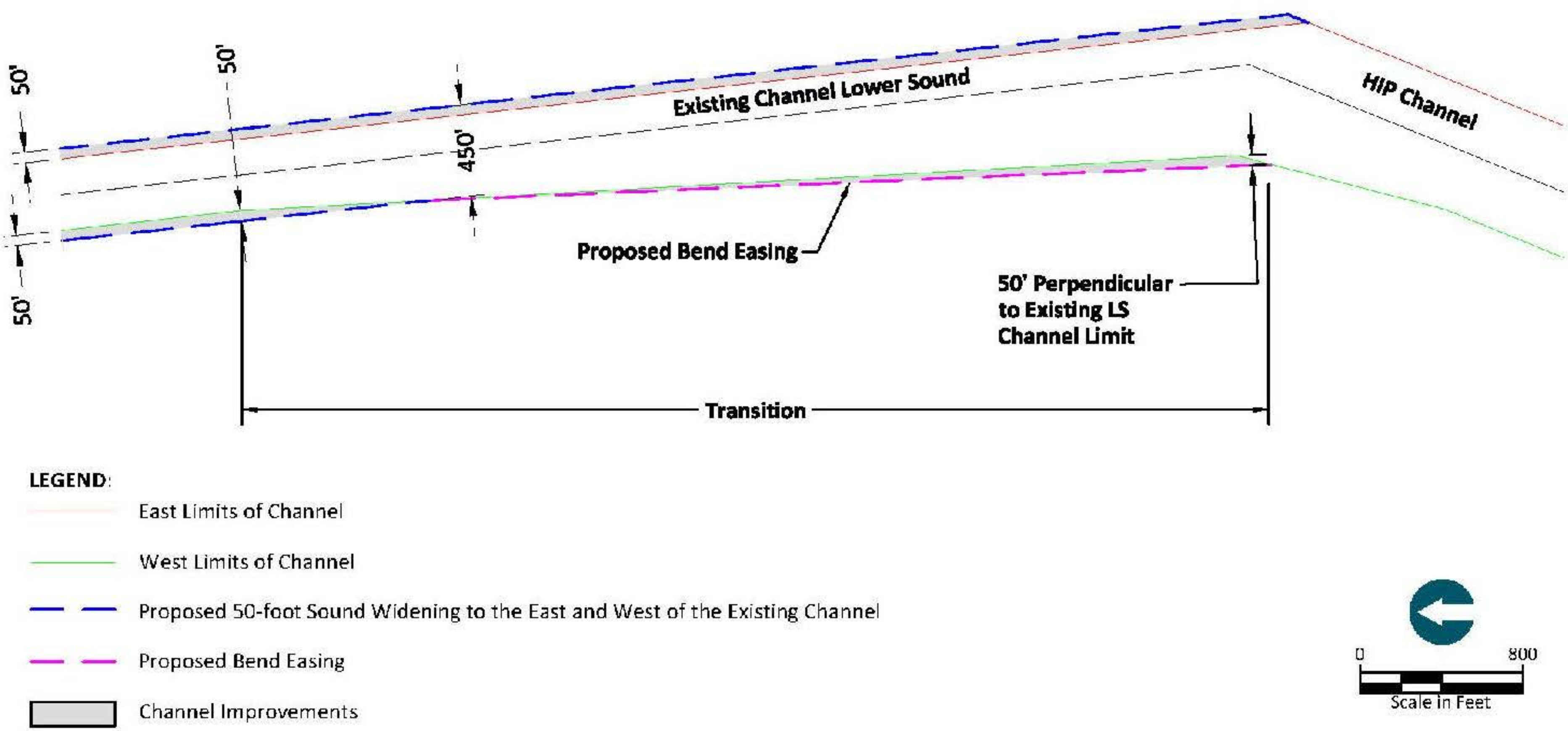
US Army Corps of Engineers
Mobile District

Figure 2.4-1
Sheet 2 of 4

Proposed Channel Widening Alternatives

(Source: Anchor QEA)

Bayou Casotte Harbor Improvement Project



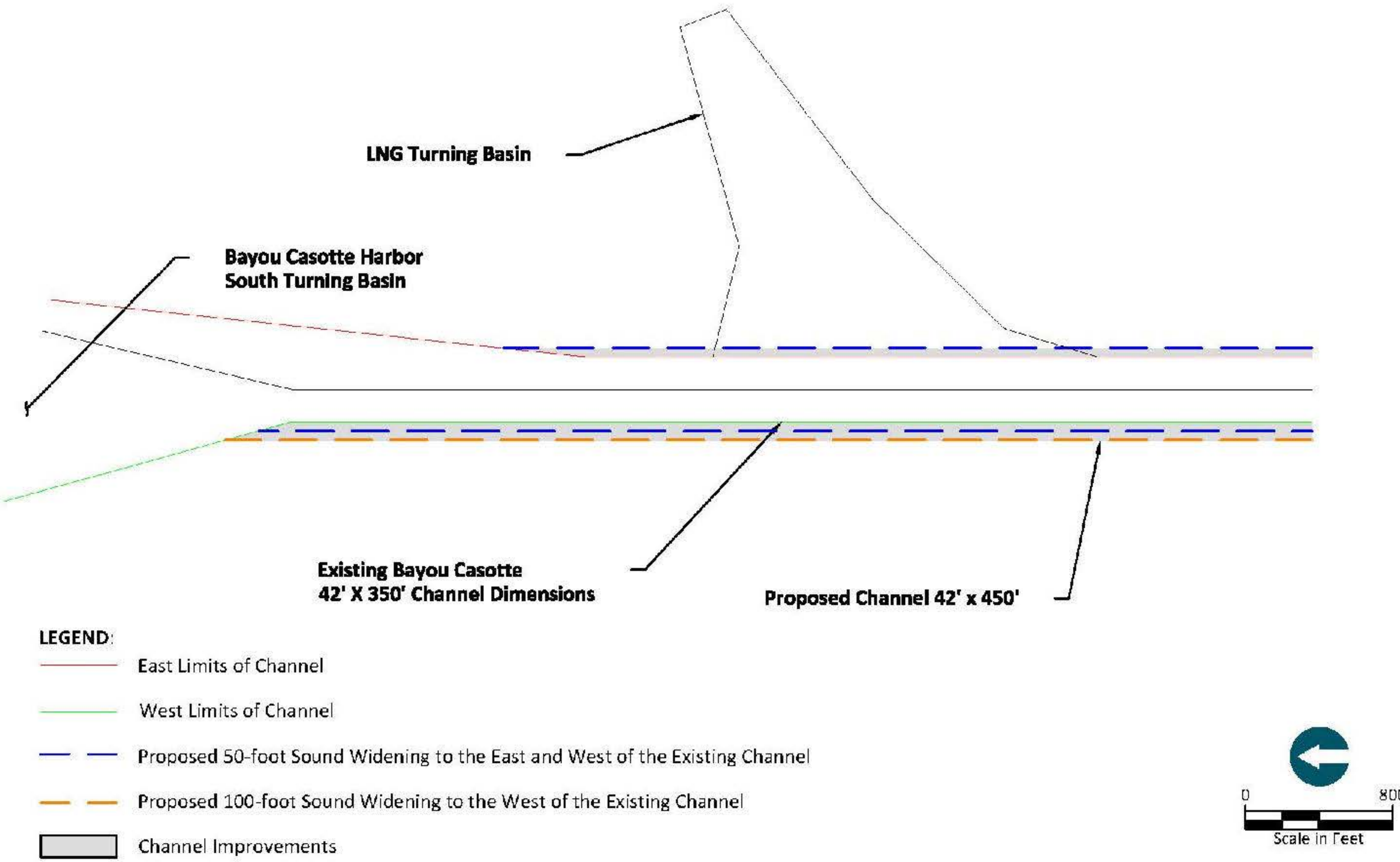
US Army Corps of Engineers
Mobile District

Figure 2.4-1
Sheet 3 of 4

Proposed Channel Widening Alternatives

(Source: Anchor QEA)

Bayou Casotte Harbor Improvement Project



US Army Corps of Engineers
Mobile District

Figure 2.4-1
Sheet 4 of 4

Proposed Channel Widening Alternatives

(Source: Anchor QEA)

Bayou Casotte Harbor Improvement Project

- Pascagoula Lower Sound Channel segment at 42 feet deep (–42 feet MLLW) and 350 feet wide, including with 2 feet of allowable overdepth and 2 feet of advanced maintenance
- Bayou Casotte Channel segment at 42 feet deep (–42 feet MLLW) and 350 feet wide, including with 2 feet of allowable overdepth and 2 feet of advanced maintenance
- South turning basin at 42 feet deep (–42 feet MLLW), 1,150 feet long, and 1,120 feet wide, including with 2 feet of allowable overdepth and 2 feet of advanced maintenance

No ATONs would require relocation. No new dredged material would be generated and no material would be available for beneficial use. Dredged material from continued maintenance would still be available.

2.4.2 Alternative 1: Applicant's Preferred Alternative – Widen the Existing Channel by 100 Feet on the West Side

Alternative 1, the Applicant's Preferred Alternative (Preferred Alternative), includes dredging approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segments to widen the channel 100 feet on the west side, parallel to the existing channel centerline, to the existing depth of –42 feet MLLW (with authorized advanced maintenance and allowable overdepth excavation consistent with the Federal Project), and the placement of the approximately 3.4 million cubic yards (mcy) of dredged material in the LZA and ODMDS.

Twenty-three ATONs (eight existing range structures, ten buoys, and five fixed lights) would require relocation under the Preferred Alternative. There is a 12-inch-diameter pipeline that crosses Pascagoula Lower Sound Channel designated as a "spare" line that will be surveyed prior to construction and may be removed under this alternative. Under the Preferred Alternative, dredged material management would include placement of approximately 3.7 percent (125,000 cy) of the dredged material in the designated LZA located east and south of Horn Island and placement of the remainder of the material (approximately 3.3 mcy) in the Pascagoula ODMDS south of Horn Island. The predominant current is east to west and fine sediments accumulate more quickly on the west side of the channel. Therefore, the volume of dredged material available for beneficial use under this alternative is limited due to the excavation of material from the west side of the channel. The majority of the LZA is located within the NPS Gulf Islands National Seashore Boundary. The Port of Pascagoula is coordinating with and applying for a Special Use Permit with NPS.

As discussed in Section 1.5, maintenance dredging will be addressed during the 204(f) Federal assumption of maintenance process, and is therefore discussed in Section 5, Cumulative Impacts, of this EIS.

Proposed dredging is anticipated to be accomplished using methods including, but not limited to:

- Hopper hydraulic dredge – a self propelled vessel, which can dredge, store, transport, and place material.
- Mechanical (e.g., clamshell) dredge – uses a bucket to excavate and elevate the dredged material to the surface for transport to a placement location.
- Cutterhead hydraulic dredge – cuts, slurries, and transports the material from the site to the placement area via a pipeline.

2.4.3 Alternative 2: Widen the Existing Channel by 50 Feet on Each Side

Alternative 2 includes dredging approximately 38,200 feet (7.2 miles) along the length of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segments to widen the channel by 50 feet on each side, parallel to the existing channel centerline, to the existing depth of −42 feet MLLW, and the placement of approximately 3.3 mcy of associated dredged material as beneficial use and in the ODMDS. Twenty-eight ATONs (eighteen buoys and ten fixed lights) would require relocation under Alternative 2. The spare 12-inch-diameter pipeline that crosses a portion of the channel to be dredged may be removed under this alternative.

Under Alternative 2, dredged material management will include beneficial use placement of approximately 9.6 percent (315,000 cy) of the dredged material in the designated LZA located east and south of Horn Island and placement of the remainder of the material (approximately 3.0 mcy) in the Pascagoula ODMDS south of Horn Island. The larger volume of material available for beneficial use under Alternative 2 is due to dredging along both sides of the channel. Sediments on the east side of the channel tend to have a greater sand content due to the east-west currents and fine sediments tend to accumulate on the west side of the channel rather than the east side. As discussed under Alternative 1, the majority of the LZA is located within the NPS Gulf Islands National Seashore Boundary. The Port of Pascagoula is coordinating with and applying for a Special Use Permit with NPS.

As discussed in Section 1.5, maintenance dredging will be addressed during the 204(f) Federal Assumption of Maintenance process, and is therefore discussed in the Cumulative Impacts section of this EIS. Proposed dredging would be completed using methods as described under Alternative 1.

2.5 COMPARISON OF ALTERNATIVES

A summary of channel widening characteristics for the three alternatives carried forward for detailed analysis in the EIS (No-Action, the Preferred Alternative [Alternative 1], and Alternative 2) is presented in Table 2.5-1. Dredging for the channel widening would be implemented by the Port (Applicant). Dredging is anticipated to begin in late 2014 or early 2015.

Alternative 1 (100 feet widening on the west side of the channel) was selected by the Permit Applicant as the Preferred Alternative because it alleviates more of the existing vessel transit restrictions (e.g., eases turns) than the project would under Alternative 2. This alternative meets the purpose and need for the project and will benefit existing facilities that use the channel and/or the Port, such as Chevron Pascagoula Refinery (Chevron Shipping Co.), MPC, Signal International LLC (east yard), VT Halter Marine, Gulf LNG Energy LLC, First Chemical Corporation, and Ingalls Shipbuilding. Table 2.5-2 provides a summary of potential direct and indirect impacts of each alternative.

Table 2.5-1
Summary of Channel Widening Characteristics of
Alternatives Selected for Further Evaluation

Project Component	No-Action	Preferred Alternative (Alternative 1)	Alternative 2
Additional width	No additional widening	100 feet on west side of existing channel	50 feet on each side of existing channel
Proposed channel depth x width	–42 feet MLLW x 350 feet	–42 feet MLLW x 450 feet	–42 feet MLLW x 450 feet
New dredged volume	0	3,390,000 cy	3,290,000 cy
New beneficial use to LZA	0	125,000 cy	315,000 cy
Dredged material to ODMDS	0	3,260,000 cy	2,980,000 cy
Number of required USCG Aids to Navigation relocations	0	23	28
Estimated cost of new work dredging	0	$24,600,000	$20,700,000

Table 2.5-2
Summary of Impacts by Alternative

<table>
<tr><th>Resource</th><th>No-Action Alternative</th><th>Preferred Alternative</th><th>Alternative 2</th></tr>
<tr><td>Geology</td><td>No change from existing conditions. Negligible changes to bottom depths of existing channel due to sedimentation and continued maintenance dredging.</td><td>No significant adverse impacts are anticipated. About 3.4 mcy of new work sediments and placement at approved LZA and ODMDS, including about 125,000 cy of littoral sands for beneficial use. Dredging and relocation of sediments will not interfere with natural movement and deposition of sediments in the Sound.</td><td>No significant adverse impacts are anticipated. Similar to the Preferred Alternative except that dredge volumes are smaller. Removal and relocation of approximately 3.3 mcy of sediment to designated placement areas, including approximately 315,000 cy of littoral sands.</td></tr>
<tr><td>Coastal Processes</td><td>No changes to existing conditions are anticipated. Impacts limited to those associated with continued maintenance dredging of the channels.</td><td colspan="2">No significant impacts are anticipated. Dredging and relocation of sediments will not impact overall coastal processes in the Sound. Placement of dredged sediments in the Littoral Zone Area (LZA) may have a positive effect by placing more sand into the littoral drift along Horn Island, thus slightly reducing erosion. Most of the LZA is within the boundaries of the Gulf Islands National Seashore and the JCPA is coordinating with the National Park Service to obtain permits for placing sediments in the LZA. Sediments not appropriate for the LZA will be placed in the Pascagoula Ocean Dredged Material Disposal Site (ODMDS), where there is ample capacity to accommodate dredged material for both alternatives, in addition to sediments anticipated from other activities in the project area, as described in the Dredged Material Management Plan.</td></tr>
<tr><td>Bathymetry</td><td>No changes to existing conditions are anticipated. Minor changes due to sediment deposition and continued maintenance dredging will continue.</td><td colspan="2">Bathymetry in the dredging corridor will be permanently changed from a current depth of 9 to 13 feet to -42 feet MLLW, consistent with the authorized depth of the existing channel. These changes would not impact areas outside of the physical disturbance and permanent alteration would be minor. The change to approximately 0.001 square mile of the bay bottom is not anticipated to adversely impact circulation patterns and other water movements. Temporary increase in elevation at dredge material placement sites will not affect currents, tides or other water movements.</td></tr>
<tr><td>Hydrodynamics</td><td>No changes to existing circulation patterns, tides, wave action, or salinity are anticipated under existing conditions.</td><td colspan="2">No significant adverse impacts to the hydrodynamics of the Mississippi Sound, including tides, currents and salinity patterns, are expected. Placement of beneficial use material will help restore littoral drift. Small reduction in time required for salinity levels to return to normal after heavy rain due to channel widening may occur. Impacts to salinity gradient would be negligible and therefore little effect on salinity concentrations during low flows is anticipated. With no change in the barrier island opening, no significant change or adverse impacts to tides, tidal currents or storm surge propagation potential would be expected.</td></tr>
<tr><td rowspan="2">Navigation and Port Facilities</td><td rowspan="2">Operational constraints would continue to occur. The current conditions restrict deep-draft vessels to one-way traffic, restrict vessels greater than 700 feet length overall (LOA) or draft greater than 36 feet to daylight travel, and impose restrictions on travel due to wind and current conditions.</td><td colspan="2">No adverse impacts anticipated under either the Preferred Alternative or Alternative 2. Based on available information for vessel transits, no increases in vessel traffic are anticipated beyond that anticipated without the project. Two-way traffic and additional nighttime transits will allow more flexibility in vessel arrival and departure times. No significant effect on the Port's commodity base; deliveries of LNG will be expedited with fewer diversions to alternate ports. No significant effect on charter or recreational boats, which are not restricted to deep shipping channels.</td></tr>
<tr><td>The Preferred Alternative will impact existing USCG-maintained ATON along the western side of the channels. Eight range structures, five lights, and ten buoys will be relocated.</td><td>Alternative 2 will impact existing USCG-maintained ATON along the eastern and western sides of the channels. Eighteen buoys and ten fixed lights will be relocated.</td></tr>
<tr><td>Air Quality</td><td>No change from existing conditions. However, emissions expected to continue due to continued dredging and sediment management activities.</td><td>Relatively small increase in emissions when compared to existing sources in Jackson County, and thus minor short-term impacts anticipated as a result of additional air emissions from harbor vessels and land-based mobile sources (primarily combustion emissions) during channel widening activities. No long-term adverse impacts are expected.</td><td>Similar to proposed project, except that emissions will be less as a result of a smaller dredging effort. Short term impacts anticipated. No long-term adverse impacts are expected.</td></tr>
</table>

Table 2.5-2, cont'd

Resource	No-Action Alternative	Preferred Alternative	Alternative 2
Noise	No change from existing conditions. Noise levels consistent with ongoing Port and maintenance dredging activities.	Noise impacts will be minor and temporary when measured by nearest noise sensitive receptors; no violations of local noise control requirements are anticipated. Noise levels of additional activities will not exceed existing conditions. Noise from dredging and ATON relocation activities could result in short-term displacement of seabirds and shorebirds that will resume normal use of foraging and roosting areas when project is completed. Underwater noise impacts are expected to be minor for marine mammals given shallow water depths, soft bottom conditions, and well-documented avoidance behaviors of animals.	
Hazardous, Toxic, and Radioactive Waste (HTRW)	No change from existing conditions. Existing pipelines for crude oil transport will remain in place. Approved and regulated facilities will continue to handle HTRW.	No hazardous materials will be released as a result of the proposed action. Landward facilities will not be affected by the proposed project and any HTRW sites have been remediated or require no additional remediation. Locations of pipelines crossing the channel are documented and approved spill response and other safety measures will be implemented to avoid risks in the unlikely event of spills or leaks.	
Water Quality	No changes to existing conditions anticipated. Any existing vessel-associated contamination would continue, consistent with the present level of vessel activities and channel maintenance.	Temporary impacts to water quality (temperature, salinity, dissolved oxygen (DO), total suspended solids) are anticipated during dredging and subsequent dredged material placement due to water column mixing. Appropriate control measures would limit these temporary impacts. Permanent effects on water temperature are expected in dredged areas given the correlation between water depth and temperature. Temporary decrease in DO and increase in total suspended solids levels are expected during dredging operations, similar to that associated with existing dredging activities. Some water samples exceeded guidance quality criteria, but the existing 4-hour, 318-fold dilution factor adequately reduces the potential impacts of these substances.	
Sediment Quality	No changes to existing conditions anticipated. Any existing vessel-associated contamination would continue, consistent with the present level of vessel activities and channel maintenance.	Lead and dioxin in some sediment samples exceed criteria levels. Exceeded dioxin Toxicity Equivalency Quotient (TEQ) values were attributable to the least toxic congener, indicating little likelihood of adverse impacts of dioxin congeners in sediments. Prior to placement of dredged material, concurrence with the EPA is needed as to whether or not these findings meet guidance for the Limiting Permissible Concentration (LPC) for lead and dioxin congeners in sediments.	
Freshwater Aquatic, Wetland, and Terrestrial Plant Communities	No changes to existing conditions are anticipated. Maintenance dredging would continue. The distribution of these communities is limited primarily to the barrier islands and associated shallow waters outside the project area.	Benefits to islands and barrier drifts are anticipated due to supplementation of littoral drift with dredged materials suitable for beneficial use at LZA. Preferred Alternative will provide 125,000 cy of material for beneficial use at the LZA site. Because aquatic, wetland, and terrestrial plant communities are absent from the project area, no direct impacts to these organisms are anticipated.	Similar benefits to islands and barrier drifts are similar to those under the Preferred Alternative. However, Alternative 2 will provide 315,000 cy of material. Because aquatic, wetland, and terrestrial plant communities are absent from the project area, no direct impacts to these organisms are anticipated.
Marine Aquatic Communities	No changes to existing conditions are anticipated. Temporary impacts of continued maintenance dredging (e.g. temporary effects of benthic organism burial in dredge material placement sites) will continue.	Impacts to open-water communities as a result of increased turbidity during dredging will be localized around the immediate area of dredging and placement and limited to the duration of the plume at a given site, but may temporarily impact localized primary production levels, finfish foraging and distribution patterns, and filter feeder filtering rates. There would be a permanent conversion of 87.6 acres of shallow habitat to deeper habitat and temporary burial of benthic organisms in placement sites. No long-term effects on benthic organisms are expected due to motility, rapid recovery of benthic communities following temporary, short term impacts in the immediate vicinity of the area dredged. No long-term turbidity impacts on artificial reefs are anticipated because of their distance from the proposed project area.	
Fish and Wildlife	Temporary impacts of existing maintenance dredging and disposal will continue and include temporary disruption of fish distribution patterns.	Permanent conversion of 87.6 acres of shallow habitat to deeper habitat. Short-term turbidity increase during construction and placement of dredge material may temporarily impact fisheries species (including recreational and commercial species), associated prey, and success of foraging bird species that dive or plunge for food. Could cause temporary impact on nesting and roosting behavior during dredge material placement. Species should return once project is complete. Temporary disruption of fish and wildlife during dredging is anticipated but no long term impacts expected. Potential temporary reduction in quality of Essential Fish Habitat (EFH) and displacement of individual species; no contamination issues or significant impacts to federally managed species. No contamination issues anticipated from beneficial use of sediments.	

Table 2.5-2, cont'd

<table>
<tr><th>Resource</th><th>No-Action Alternative</th><th>Preferred Alternative</th><th>Alternative 2</th></tr>
<tr><td>Threatened and Endangered Species</td><td>No changes to existing conditions and no significant adverse impacts are anticipated under existing conditions. Any displaced animals would be expected to resume normal use of the area following maintenance dredging.</td><td colspan="2">Temporary changes include underwater noise caused by dredging and placement of sediments, potential changes to DO, turbidity, sediments, and predator/prey dynamics for benthic feeders.
Potential temporary displacement of West Indian manatee, Gulf Sturgeon, Alabama shad, bald eagle, brown pelican, Mississippi sandhill crane, and piping plover may occur. Migration windows for construction will be recognized to avoid potential harm during sturgeon migration.</td></tr>
<tr><td>Sea Level Rise/
Climate Change</td><td>Continued rapid land loss from barrier island s is anticipated as a result of rising sea level, frequent intense storms, and reduced sediment supply.
Continued trends in greenhouse gas emissions. Continued effects of sea level rise (SLR), including erosion, reduced sediment supply, and more frequent and intense storms, are also anticipated.</td><td colspan="2">Addition of dredged materials for beneficial use (125,000 cy with Preferred Alternative and 315,000 cy with Alternative 2) would supplement sediment budgets in project area and ameliorate continued land loss and shifts associated with barrier islands. Alteration of longshore sediment delivery across the channel may increase vulnerability of coastal barrier islands, specifically Horn Island.
Greenhouse gas (GHG) emissions associated with dredging activities and on-road vehicles as part of the proposed project would be so small as to be a negligible consideration. The main potential source of GHG emissions would be the loss of carbon sequestered in the ecosystem. Increases in GHG can exacerbate existing effects of SLR, including erosion, reduced sediment supply, and increased occurrence and intensity of storm events, which in turn may require additional maintenance dredging in channels. Addition of dredged materials for beneficial use would help reduce continued land loss and shifts associated with barrier islands by supplementing sediment budgets in project area. Alteration of longshore sediment delivery across the channel may increase vulnerability of coastal barrier islands, specifically Horn Island.</td></tr>
<tr><td>Cultural Resources</td><td>No additional impacts anticipated, as no new activities would occur (maintenance dredging would continue). Adverse impacts to existing in situ burials and remaining portions of sites 22JA516 and 22JA618 would continue. Anticipated impacts to cultural and archaeological resources will require mitigative actions developed through a Memorandum of Agreement between the Mississippi Department of Archives and History, USACE, and Advisory Council for Historic Preservation.</td><td colspan="2">Anticipated impacts to cultural and archaeological resources will require mitigation actions developed through a Memorandum of Agreement between the Mississippi Department of Archives and History, USACE, and the Advisory Council for Historic Preservation. According to the USACE Mobile District, there is not currently an MOA or formal burial treatment plan in place. The USACE Mobile District has proposed a draft work plan for the archaeological Phase III data recovery of the 22JA516 archaeological site if the site cannot be avoided as part of the proposed project. The draft work plan contains environmental and site-specific cultural overviews, an overview of completed cultural resources work at the site, a research design, Phase III archaeological methods, laboratory and specialized analysis methods, methods to curate materials, public interpretation/education, USACE-prepared Plan for the Treatment of Human Remains, and a project schedule. The USACE Mobile District has also initiated consultation with the MDAH and interested federally recognized Native American tribes.</td></tr>
<tr><td rowspan="2">Land Use</td><td rowspan="2">No change to land use, utilities, public safety, transportation or parks, recreational areas or other community facilities is anticipated.</td><td colspan="2">No adverse impacts anticipated. Reduced transit restrictions are expected to increase the efficiency of Port and channel activities, maintain the safety of vessels transiting the Port and may help to improve the economy by providing more opportunities at the Port. No increase in ground traffic is anticipated. No impacts to utilities or parks, recreational areas or other community facilities are anticipated.</td></tr>
<tr><td>Widening along only the west side of the existing channel will not affect existing marine terminals at the Port.</td><td>Widening along the east and west sides of the existing channel will locate the channel closer to existing marine facilities.</td></tr>
<tr><td>Socioeconomics</td><td>No changes to existing conditions without the proposed project. Current and projected population trends would continue, and increases in population following the post-Katrina decline are anticipated.</td><td colspan="2">Beneficial effects of the proposed project include temporary increase in jobs and migration of workers and associated demand for temporary housing and spending of disposable income. Vessel transits are not anticipated to increase beyond that anticipated under the No-Action Alternative; however, increased efficiencies would result in reduced operating costs for vessel operators and greater availability of marine terminals, which would be an economic benefit for the vessel operators and/or marine terminal.</td></tr>
</table>

3.0 AFFECTED ENVIRONMENT

Section 3 presents a description of the existing conditions in the BCHIP study area. Existing conditions provide the baseline for the No-Action Alternative and include future without-project conditions as appropriate. Therefore, this section presents the context for the analysis of the environmental consequences in Section 4. For the purposes of analysis in this EIS, unless otherwise defined, the project area is defined as the geographic area that represents resources potentially affected by the proposed project and the range of alternatives developed to meet the purpose and need for the proposed project (see Figure 1.7-1).The project area for this EIS is based on and includes the components listed below.

- Pascagoula Lower Sound/Bayou Casotte Federal Channel segment proposed for widening
- Potential dredged material placement sites
  - LZA (south and east of Horn Island)
  - Pascagoula ODMDS
- Extent of sediment plumes and effects of local currents (Johnson et al. 2010, Vinogradova 2005)
- A buffer of 1,000 feet in addition to the channel footprint to include MDEQ recommendations for mixing zones (750 feet)

While some of the resources examined for this EIS extend beyond the project area, the study area is large enough to encompass the potential impacts of the proposed project on the majority of resources addressed in this EIS. The study area for a specific resource, if different from Figure 1.7-1, will be defined in the resource section of this section.

3.1 GEOLOGY

The geologic setting presented here for the Pascagoula River Harbor area, which includes the Bayou Casotte Harbor Channel, is based on information presented in the Final Supplemental EIS, Pascagoula Harbor Navigation Channel (USACE 2010). This information is being used because the two projects share the same geology and study area. It is important to examine the geology resource because channel dredging has the potential to affect underlying geologic features, which could interfere with the natural movement and deposition of sediments in the Mississippi Sound.

The mainland shoreline of the state of Mississippi formed in the Sangamon interglacial period, approximately 110,000 to 130,000 years ago, when sea levels peaked at approximately 16 to 26 feet higher than current levels. Sea level began to decline again later in the Pleistocene Epoch as temperatures cooled, between 15,000 and 70,000 years ago. As the sea level declined, river trenches were eroded into the prairie terrace of the Gulf of Mexico farther out to sea than the current location of the Mississippi barrier islands. As temperatures increased from the end of the Wisconsin period to the early Holocene, approximately 12,000 to 15,000 years ago, sea level rose again, and stabilized at the current level by 4,500 years ago. During this era, sediment filled the river trenches and the bays of the state of Mississippi coast formed (USACE 1989).

The existing shoreline along the state is located on the Gulfport Formation, underlain by the Biloxi Formation (USACE 2010). The Gulfport Formation includes fine- to medium-grained sand, which is often humate-stained. Humate is a dark brown to black organic-rich amorphous matter that formed after deposition and permeated the lower Gulfport sand intervals. The Biloxi Formation is muddy sand and fossil-rich. Holocene sediments are predominantly found in the Pascagoula Bay shoreline and consist mostly of sandy fine-grained silts and clays with significant organic material (such as marshes), generally unconsolidated, and ranging in thickness from 2.0 to 14.5 feet (USACE 2010).

Currently, the northeastern Gulf of Mexico, from western Florida to the Mississippi Delta, is distinguished by three major geologic systems: the Mississippi-Alabama Shelf system, the western Florida barrier island system, and the Mississippi Sound barrier island system (EPA 1991). The Gulf of Mexico in the vicinity of Pascagoula is characterized by the Mississippi-Alabama Shelf system. This system forms a triangular area south of the Mississippi barrier islands and extends from the Mississippi River Delta to the De Soto Canyon to the 656-foot-depth contour. The Mississippi-Alabama Shelf system is about 80 miles wide at its western edge and narrows to 35 miles to the east. It is broad and nearly a flat plain bound on the landward side by the relatively steep and narrow shoreface of the Mississippi Sound. Along the barrier islands the break in slope between shoreface and shelf occurs at about –20 feet MLLW. In the eastern portion of the barrier islands, in the vicinity of Dauphin Island, the shoreface has a gradient of –50 to –60 feet MLLW per 0.62 mile and the shelf has a gradient of approximately –3.2 feet MLLW per 0.62 mile (EPA 1991).

The Mississippi Sound barrier island system is composed of segmented chains of sandy islands broken by shallow passes having widths comparable to the lengths of the islands. Cat, Ship, Horn, Petit Bois, and Dauphin islands make up the Mississippi Sound barrier island system. The barrier islands along the Mississippi, Alabama, and western Florida coast were formed during the submergence of dune beach ridges in the early Holocene, approximately 4,000 years ago (EPA 1986). At that time, these islands formed an island-shoal barrier 143 miles long between Dauphin Island and the current location of metropolitan New Orleans. Between 2,300 and 3,000 years ago, St. Bernard Delta sediments from the Mississippi River migrated into the Gulf of Mexico and settled onto the sea bottom from 2 to 12.5 miles south of Cat, Ship, and Horn islands. These sediments reduced wave energy from the west and stopped sediment accretion on Cat Island. After the Mississippi River changed course and the St. Bernard Delta sediments no longer flowed into the Gulf, erosion of existing delta sediments led to the erosion of the Mississippi coast marshlands (USACE 1989).

The barrier islands migrated to the west over time, due to accretion of sediments on the western ends and erosion on the eastern ends. The barrier island facies (rock characteristics), which characterize the formation, composition, and fossil content of the rock, are typically well-sorted, medium-grained, mature quartzose sand with less than 3 percent feldspar and a mineral suite rich in staurolite and kyanite. The facies have an average width of 2.5 miles and an average thickness of 40 feet. The barrier islands tend to feature sand beaches with dunes on the south shore and beach or intermittent marsh on the north shore. The island interiors are typically broad, low sand flats that are 1 to 2 feet above mean sea level (msl) or vegetated beach ridges 5 to 15 feet above msl (USACE 1989).

3.2 COASTAL PROCESSES

3.2.1 Flood Elevations

The Federal Emergency Management Administration (FEMA) has developed a Flood Insurance Rate Map to identify the extent of flood water inundation from a 100-year flood event. The 1 percent annual chance flood (100-year flood, also known as the base flood), is a flood that has a 1 percent chance of reoccurrence or being exceeded in any given year.

Port of Pascagoula Bayou Casotte Harbor Terminal Flood Zone

The Port of Pascagoula Bayou Casotte Harbor Terminal has an average base floodplain elevation of between 14–16 feet and is mostly zoned AE and X except at some of the southernmost berths and coastal land areas. Some pier style berths are designated zone VE with 17 feet flood elevation and all coastal areas zoned VE. There are large areas zoned X that have a 0.2 percent annual chance of flood. These appear to be dredged material storage locations with elevated dikes (FEMA 2009).

3.2.2 History of Severe Storms

The Pascagoula/Gulfport Mississippi coast is exceeded by only New Orleans and Galveston in the northern Gulf of Mexico for the number of direct hurricane landfalls, with a total number ranging between 15 and 19 storms in the past 60 years, according to the National Oceanic and Atmospheric Administration (NOAA) website. The highest category for a named tropical weather event is H5 based on the Saffir-Simpson Hurricane Scale rating. Five of the worst storms impacting the United States made landfall within 65 nautical miles of Pascagoula all with a Saffir–Simpson Hurricane Scale rating of Category H5, at or near landfall. These storms include hurricanes Ethel 1960, Camille in 1969, Georges in 1998, Ivan in 2004, and Katrina in 2005, all with winds in excess of 155 mph, at or near landfall. Storms by category that have passed within a 65-nautical-mile radius of Pascagoula are mapped in Figure 3.2-1. The information in the figure is from the NOAA website (NOAA 2011f).

3.2.3 Sediment Transport and Dredged Material Placement Sites

According to the USACE (2011a), prevailing winds from the east and associated waves induce longshore currents that move sediment to the west in the Mississippi barrier island and mainland

Historical Hurricane Tracks

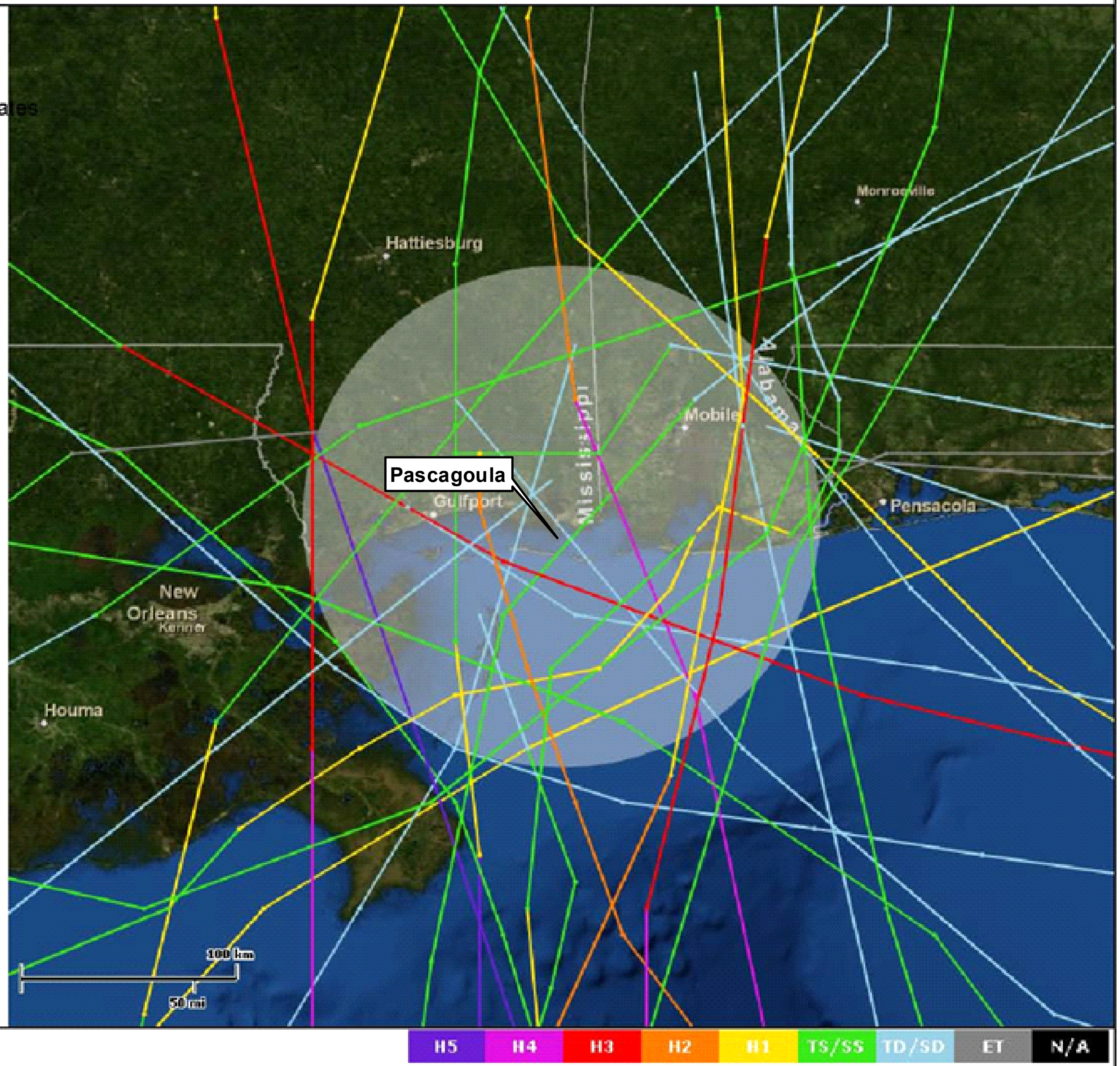
National Oceanic and Atmospheric Administration

Summary of Search:

Location: Pascagoula, Mississippi, United States
Buffer: 120380 Meters (65 Nautical Miles)
Search Refined By:
Timeframe

Summary of Storms

Category	Count
Category 5 (H5)	5
Category 4 (H4)	2
Category 3 (H3)	2
Category 2 (H2)	1
Category 1 (H1)	5
Trop./Sub. Storm (TS/SS)	8
Trop./Sub. Depression (TD/SD)	7
Extratropical (ET)	0
Unknown (N/A)	0



http://www.csc.noaa.gov/hurricanes

US Army Corps of Engineers
Mobile District

Figure 3.2-1

Historical Hurricane Tracks
Nautical Miles - 65; Timeframe - 1950 to 2010
(Source: NOAA 2011)

Bayou Casotte Harbor Improvement Project

areas. As a result, the barrier islands migrate approximately 50 feet per year to the west. Annual average wave conditions, including specific storm events, cause the beaches to shift due to structures located along the Mississippi mainland coastline, though they remain relatively stable. However, during higher wave conditions, sand typically bypasses these structures. Despite these effects of longshore processes on beaches, cross-shore processes primarily control shoreline response. Salinity-induced flocculation of silt and clay, originating from tributaries to the Mississippi Sound, Mobile Bay, and rivers along the northern border, results in continuous sediment accumulation in the Sound and associated navigation channel and produces elevated turbidity levels, causing the Sound's characteristic brown color.

A summary of bathymetric changes from the mid-1800s to 2009 (Buster and Morton 2011) indicates that the bathymetry surrounding the Mississippi and Alabama barrier islands and Mississippi Sound primarily reflects the processes that drive natural migration of a barrier-island chain. Littoral processes, subsidence and sea level rise, and storm activity control natural deposition and erosion of sediment in the nearshore environment, producing significant seafloor changes in tandem with island movement from east to west. The changes to various morphological coastal features include gains/losses of land, appearance/disappearance and locations/sizes of inlets and shoals, and reworking of shoals along island perimeters and within passes between the islands. Between the mid-1800s and the early 1900s, the majority of the system remained in its natural state of reforming as a result of natural processes. After channels were dredged, the dynamics of the island system changed. Migration of the islands was affected by the termination of natural migration of Petit Bois and Ship Islands and decreasing downdrift sediment availability. The channels dredged through Mississippi Sound prior to the surveys conducted in the 1960s show probable linkage to increased overall accretion within the sound, especially around the channels themselves. Other areas of accretion in the sound are probably due to natural processes, such as overwash of barrier islands from storm activity and natural sediment accumulation in the deeper central portion of Mississippi Sound, which acts as a sediment sink. The sediment entering Mississippi Sound and being deposited just to the southeast of Biloxi Bay and to the north of Horn Island may be trapped by the bathymetric highs around and to the south of Round Island.

There are two potential dredged material placement sites that could be utilized within the project area to accept new work material excavated to complete the proposed channel widening: LZA and Pascagoula ODMDS.

In 1991 the Pascagoula ODMDS was designated by the EPA for both new work and maintenance material generated by the Pascagoula Harbor Channel area executed by both public and private entities (Anchor QEA 2012, Appendix B). As a result, it requires no further permitting (but material must be determined suitable for disposal). It is located just south of Horn Island and bound by Horn Island to the north, the Pascagoula Harbor Navigation Channel to the east, the navigation safety fairway to the south, and a north-south line running through Dog Keys Pass to the west (Figure 1.7-1). The coordinates of the center of the site are 30°10'09"N and 88°39'12"W. The Pascagoula

ODMDS ranges from depths of about –38 feet MLLW in its northern portion to over –52 feet MLLW in its southern portion (EPA and USACE 2006, Anchor QEA 2012). Placement of dredged material at the ODMDS is restricted to depths below –20 feet MLLW.

As discussed in the DMMP (Anchor QEA 2012, Appendix B), there are significant offshore hydrodynamic conditions at the Pascagoula ODMDS that would promote erosion and off-site dispersion of newly placed dredged material. The "dispersiveness" of the site and associated capacity has not been determined (EPA and USACE 2006). However, this site has been used by previous new work and maintenance dredging events within the vicinity of the Port of Pascagoula resulting in no documented capacity concerns. The estimated volume of sediments to be placed at the ODMDS under the preferred alternative is 3.3 mcy, which is below the 10 mcy threshold identified in the SMMP for evaluation of dispersive nature and long- and short-term capacity of new work volumes. However, conservative estimates have been developed based on data available from SMMP.

- Estimated dredged material volumes placed at the ODMDS through 2010 range from 50 to 80 mcy and projected estimates for the 10 years following 2006 (i.e., through 2016) are 3 to 8 mcy.
- Dredged material is placed in a designated portion of the ODMDS until the depth limitations are reached before beginning placement in another designated portion of the ODMDS.

Therefore, a conservative estimate of remaining capacity of the ODMDS can be calculated based on the areal extent of the ODMDS that has not been designated for use. Using the coordinates of the designated ODMDS and the designated portions in use for sediment placement (Figure 1.7-1), the remaining areal extent available is 26.9 square miles. Therefore, the Pascagoula ODMDS has ample capacity to accommodate the proposed project.

The LZA (located between the –14- and –22-foot MLLW depth contours) is an open-water dispersive site southeast of Horn Island and west of the existing Safety Fairway and the Horn Island Pass, which has already been permitted for use. As discussed in the DMMP (Anchor QEA 2012, Appendix B), the northeastern portion of the LZA is the most shallow area of the site, while the southwestern region is the deepest. The site's specific capacity for new dredged material is unknown; however, this site has been used by previous new work and maintenance dredging events within the vicinity of the Port of Pascagoula, resulting in no documented capacity concerns. The proposed project sand quantity is not expected to exceed the site's capacity. This site presents an opportunity for the beneficial use of the sand component of the dredged material as the natural east-to-west littoral drift will transport sandy sediments towards the barrier islands and other nearshore areas. Although site maintenance is not a requirement, pre- and post-placement surveys are necessary to determine on-site bathymetric conditions (to verify that capacity within any subarea of the site has not exceeded the established limitations).

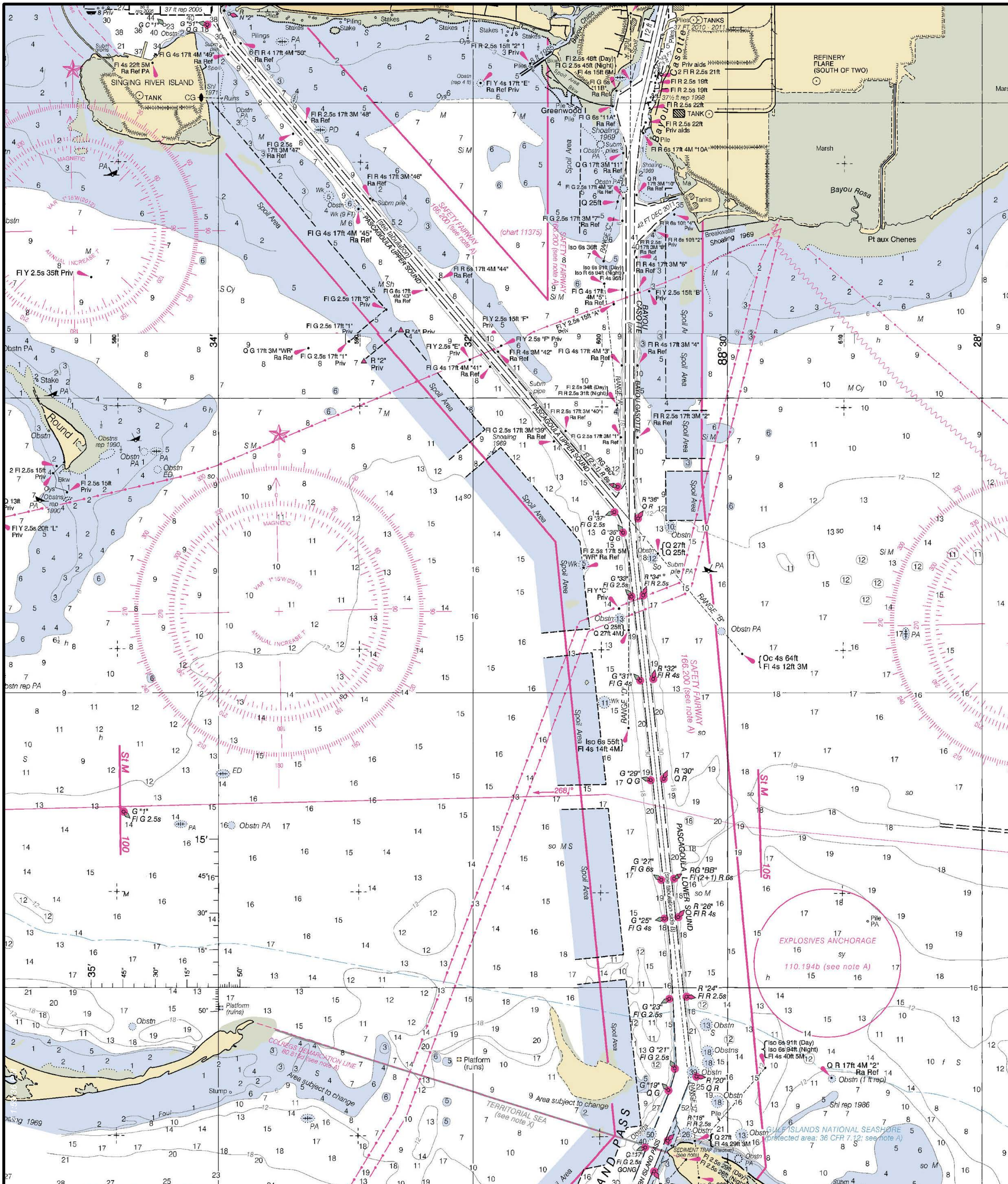
3.3 BATHYMETRY

Mississippi Sound is a bay system extending from Lake Borgne, Louisiana, to Mobile Bay, Alabama, comprising approximately 1,850 square miles. The southern boundary of the Sound consists of widely spaced barrier islands (Cat, Ship, Horn, Sand, Petit Bois, and Dauphin islands). Navigation channels for Gulfport, Biloxi, and Pascagoula cross the Sound north to south while the GIWW spans the Sound from east to west.

The Sound has markedly different bathymetric regions (Blumberg et al. 2000). The upper and western Mississippi Sound is shallow, with depths ranging from about –3 to –9 feet MLLW. The remainder of the Sound is deeper, ranging in depth from about –9 feet to more than –600 feet MLLW, with the deepest areas south of the barrier islands. Where the Pascagoula Harbor Navigation Channel extends across the Mississippi Sound, the northern half of that portion of the Sound has natural water depths of about –13 feet MLLW or less. Depths in the southern half of the Sound range from approximately –13 to –20 feet MLLW. South of Horn Island, natural depths range from approximately –20 to –45 feet MLLW in the vicinity of the ship channel. The Pascagoula Harbor Navigation Channel passes between Horn Island and Petit Bois Island through Horn Island Pass. The islands are separated by approximately 3.5 miles of open water, which ranges in depth from –1 to –20 feet MLLW. The currents around the barrier islands transport sand and tend to extend the western edges of the islands and erode the eastern ends. As the islands move west, the channel also shifts west.

The open-water disposal sites along the west side of the channel extend from disposal area 5, located south of Singing River Island, to disposal area 10, located between Petit Bois and Horn Islands. Along Bayou Casotte Channel, open-water disposal sites 3 and 4 are positioned to the east. At the more-inshore disposal areas (5 and 6), typical depths range from –7 to –10 feet MLLW. Open-water disposal sites 3 and 4 have depths ranging from less than –4 feet MLLW to greater than –10 feet MLLW. At disposal areas 8 and 9 in the mid-Sound, depths range from –12 to –15 feet MLLW. Because of the distance from shore and the proximity of the barrier islands, disposal area 10 has the greatest range of depths, from –7 to –15 feet MLLW. A nearshore littoral zone disposal area is located between the –14 and –22-foot MLLW depth contours southeast of the east end of Horn Island. The Pascagoula ODMDS is an area of approximately 18.5 square miles, with depths varying from around –30 feet MLLW in the north to over –60 feet MLLW in the southern section (dredged material placement sites are discussed in Appendix B and subsection 2.3.2).

Figure 3.3-1 presents a portion of the project area from NOAA Navigation Chart 11373 with navigation fairways for the major ports and depth contours displayed (NOAA 2011a). The natural bathymetry of the Gulf of Mexico outside of the maintained channel gradually shallows from –45 feet to –20 feet MLLW at the entrance to Horn Pass. On either side of Horn Pass, the depths range from –20 to 0 feet MLLW along the shorelines at Petit Bois and Sand Islands. The lower



US Army Corps of Engineers
Mobile District

Figure 3.3-1

NOAA Navigation Chart

Bayou Casotte Harbor Improvement Project

N

Mississippi Sound ranges in depth from –6 to –19 feet MLLW and gradually becomes shallower in upper Mississippi Sound north of the Pascagoula/Bayou Casotte split in the channel. The depths in the northern portion of the Mississippi Sound range from –2 to –12 feet MLLW.

3.4 HYDRODYNAMICS

The major freshwater inflow sources to the Mississippi Sound include the Mississippi River and Lake Pontchartrain basin, and the Pearl, Pascagoula, and Mobile rivers. The Pascagoula River is the most important freshwater flow source near the proposed project, but the smaller Jordon, Wolf, and Biloxi rivers also contribute to inflows near the project area. As discussed in Section 3.5, the southern boundary of the Sound includes widely spaced barrier islands (Cat, Ship, Horn, Sand, Petit Bois, and Dauphin islands, Figure 3.3-1). Navigation channels for the cities of Gulfport, Biloxi, and Pascagoula cross the Sound north to south while the GIWW spans the Sound from east to west. Because the barrier island system is relatively open, water passes between barrier islands, and salinity levels tend to be predominantly influenced by the Gulf except during high inflow periods (Jarrell 1981, Orlando et al. 1993).

Gulf tides in the Sound average 1.4 feet and exhibit a mixed diurnal-semidiurnal pattern. Spring tides often exceed a range of 2.0 feet while neap tides may be less than 0.1 foot in range. The tides are a complex mixture of the Gulf tide and a partial reflection of the tidal waves from the barrier islands (Seim et al. 1987).

In addition to freshwater inflows and tidal oscillations, winds play an important role in water movement. Strong southerly or onshore winds associated with low pressure systems can bring in additional water from the Gulf and produce high water levels near shore. Frontal passages can produce strong offshore winds, rapidly reducing the water level in the Sound and near shore waters. Strong winds and associated wave energy can produce substantial erosion on both the northern shore and the barrier islands. Tropical storms and hurricanes (subsection 3.2.2) play a major role in system hydrodynamics. Storm surges can transport large quantities of higher salinity Gulf waters into the Sound while heavy rains, which may or may not accompany a storm, can flush salinity from the Sound.

The average depth of the Mississippi Sound is approximately –13 feet MLLW. The northern or near-shore portions of the Sound have the shallowest depths while the greater depths occur near the barrier islands. The deeper navigation channel allows the development of a density current that contributes to salinities in the system (Orlando et al. 1993).

As part of the planning process for channel improvements, a current and wave measurement program was undertaken for a number of locations along the Pascagoula Navigation Channel and the area immediately outside of Horn Island Pass (Evans Hamilton, Inc. 2011). The data collection spanned the period from June 2009 through July 2010 and included both fixed station and boat surveys. The fixed stations were occupied on a near-continuous basis while the boat stations were surveyed during three periods, June 20–21, 2009, November 18–20, 2009, and March 23–24, 2010.

The location of fixed stations 1 and 2 (white boxes with corresponding station numbers) and transects (illustrated by red lines) employed for observations from the boats are shown on Figure 3.4-1. Figure 3.4-2 provides an example of the detailed current data for Station 1 during December 2009, and illustrates some of the general trends. The data from Station 1 indicates diurnal tides during the spring phase of the tidal cycle, which degenerate to irregular oscillations during neap tides. Evans Hamilton Inc. (2011) notes that during spring tides the flow direction tended to be uniform from surface to bottom. During the neap phase local effects such as wind tended to determine the surface currents resulting in non-uniform distribution of flow direction through the water. They also note that during the neap phase, a density current could be observed. Flow direction tended to become stratified and almost independent of tide stage with surface currents primarily flowing to the southwest (out of the Sound) and deeper, higher salinity currents flowing to the northeast, into the Sound.

3.5 NAVIGATION AND PORT FACILITIES

The purpose of this section is to describe existing conditions at both port terminals, including general vessel traffic in the vicinity of the proposed project. Vessel navigation in the port and commercial and recreational vessels passing nearby are described.

3.5.1 Port Navigation Guidelines

The Pascagoula Bar Pilots Association has published guidelines for vessel navigation at the Port. The following guidelines for vessels arriving at the private and public docks in Jackson County are recommended (Pascagoula Bar Pilots Association 2011). Due to the restrictive nature of the channel, certain vessels are limited to navigation during daylight hours only and the addition of a second pilot is required when vessel visibility from the bridge is limited. These include the following:

1. As weather permits, drill rigs and other non-descript vessels will require a minimum of two pilots for any movement and will be restricted to daylight hours only. Vessels of this type will be required to sign a Hold Harmless Agreement for all movements. Those drill rigs docking and undocking in congested areas may require two pilots on the rig in addition to one pilot on the lead tug.
2. Vessels capable of loading and discharging rigs and barges will be restricted to daylight movements only and when loading or discharging rigs will require two pilots for channel and harbor movements.
3. Vessels in excess of 700 feet in length will turn in the Pascagoula River and Bayou Casotte turning basins during daylight hours only. Vessels in excess of 700 feet in length or with a beam greater than 125 feet will cross the Pascagoula Bar during daylight hours only.

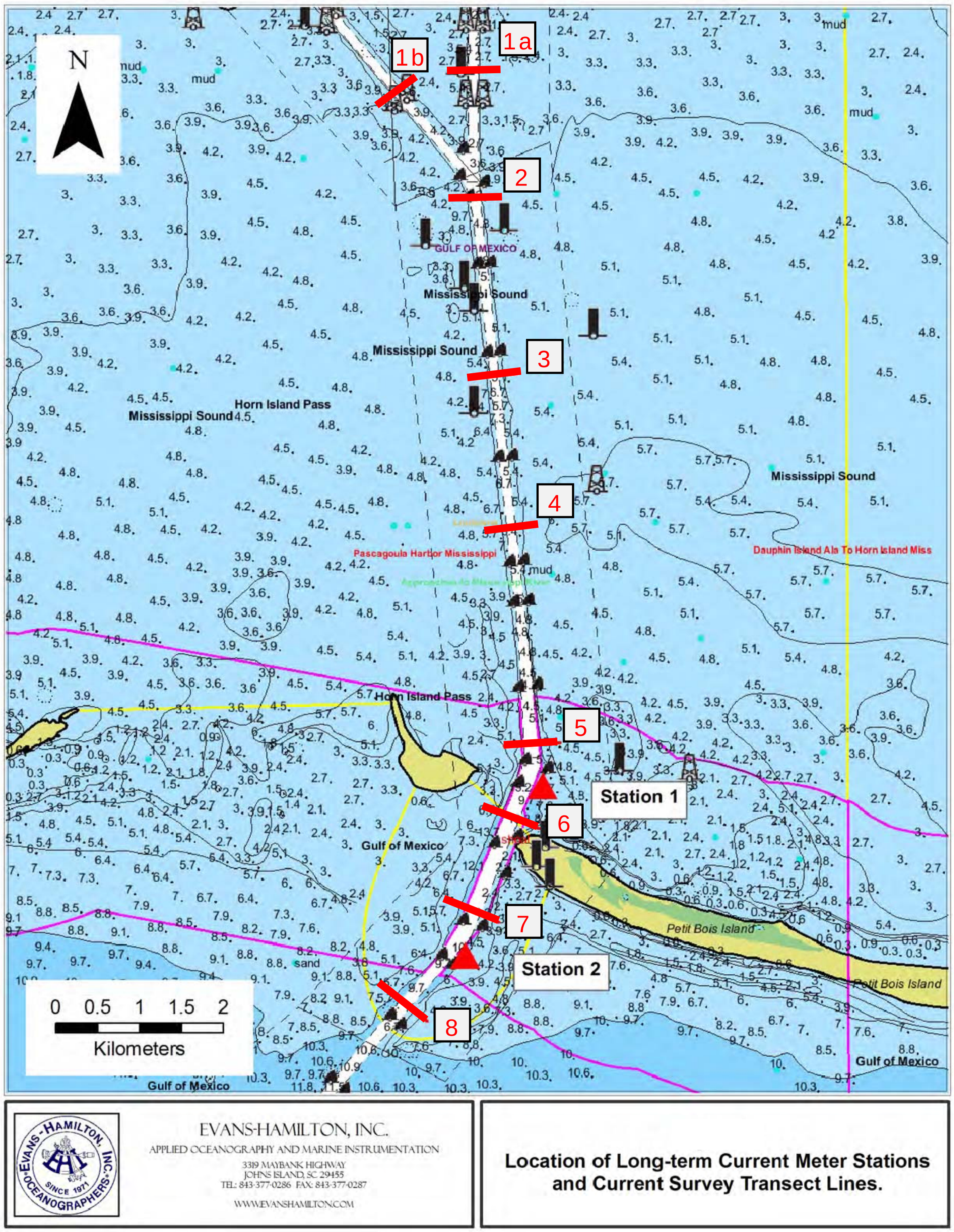


Figure 3.4-1
Fixed Station and Transects for Current and Wave Measurement Program
(Source: Evans Hamilton Inc. 2011)

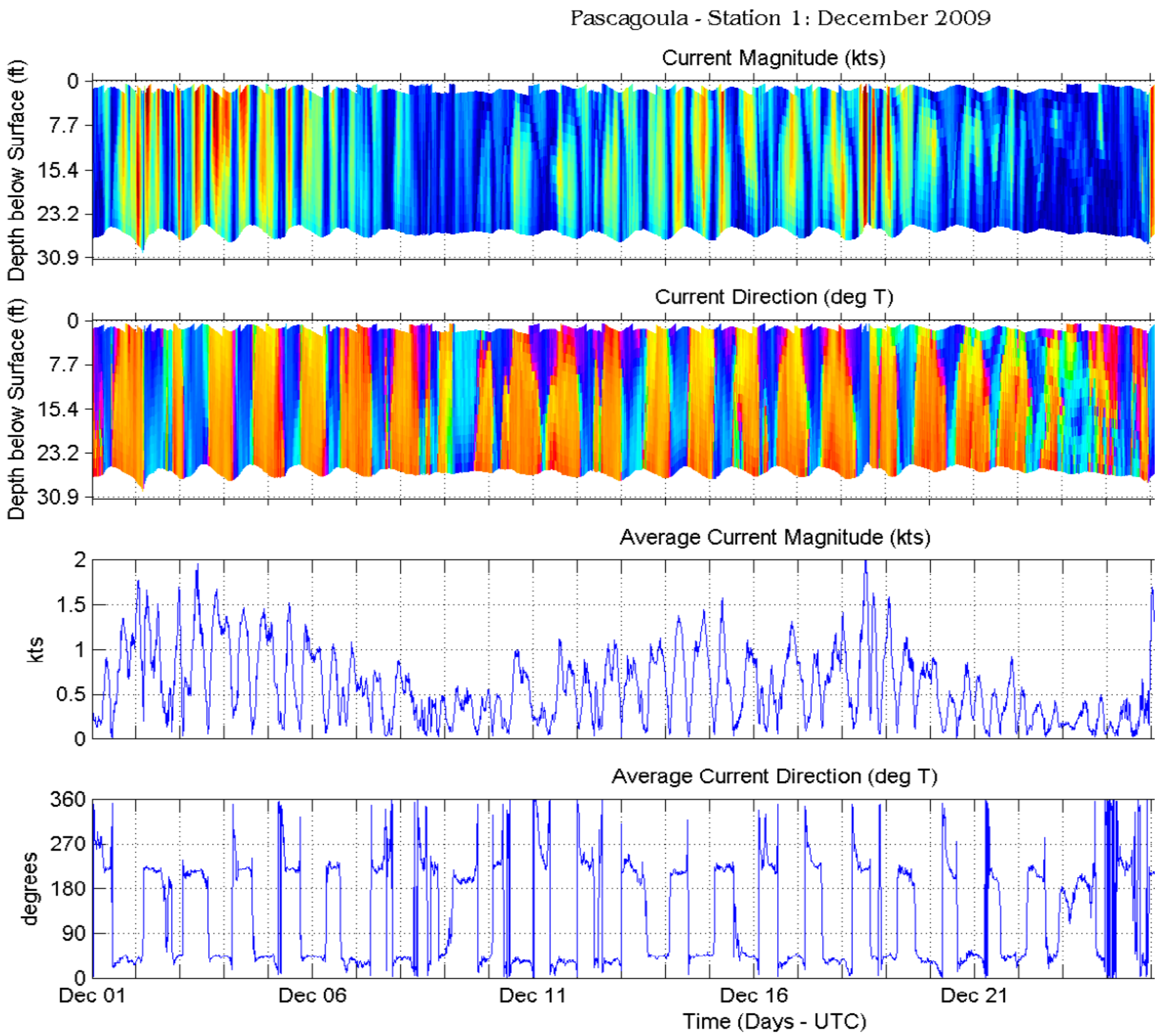


Figure 3.4-2. Example of Detailed Current Data for Station 1, December 2009 where kts = knots, deg T = degrees True, and UTC = Universal Time Coordinated. (Source: Evans Hamilton Inc. 2001)

4. Those vessels less than 700 feet in length or less than 125 feet in beam will be limited to daylight movement when the draft exceeds 36 feet.

5. Those vessels docked head-out that exceed 700 feet in length or exceed 125 feet in beam may sail at night at a 27-foot draft or less after being considered on a case-by-case basis. Extra tugs may be required.

6. These requirements are established as guidelines only with each ship being considered on a case-by-case basis, as to its characteristics and maneuvering capabilities. As weather also plays a great part in the maneuvering of vessels, consideration will be given to high winds, high river current, reduced visibility, or a large range in tide.

7. The number of tugs used will be decided by each individual pilot with all factors taken into account.

In addition to these guidelines, vessel simulator studies have been performed to assess conditions for LNG carrier operations. A total of 116 vessel simulator runs were conducted over 3 years using a 165,000-cubic-meter LNG carrier (954-foot length and 142.5-foot beam) with tug escorts under a full range of weather and tide conditions. Through the course of simulations, it was determined that easing the bends through the Horn Island Pass and widening the channel 100 feet along the west side of the length of the Pascagoula Lower Sound and Bayou Casotte channels would be sufficient for the needed channel availability under a broader range of operating conditions (Appendix A).

3.5.2 Pascagoula Harbors, Channels, and Turning Basin

3.5.2.1 Mississippi Sound

The proposed channel widening will occur in the Mississippi Sound (Figure 3.3.1), which spans the Gulf Coast of the state of Mississippi. The islands of Cat, Ship, Horn, Petit Bois, and Dauphin, along with a number of sand bars, separate the Sound from the Gulf of Mexico. Water exchange with the Gulf takes place through the various passes formed by the islands and sand bars.

Deepwater ports along the sound include Gulfport and the Port of Pascagoula. Dredged ship channels provide ship access from the ports to the Gulf of Mexico (Gulfbase.org 2011).

3.5.2.2 Gulf Intracoastal Waterway

The Intracoastal Waterway is a 3,000-mile inland waterway along the Atlantic and Gulf coasts of the United States. It provides a navigable route away from the hazards of the open sea. The waterway runs for most of the length of the eastern seaboard, from its unofficial northern terminus at the Manasquan River in New Jersey, where it connects with the Atlantic Ocean at the Manasquan Inlet, then around the Gulf of Mexico to Brownsville, Texas.

The GIWW is that portion of the Intracoastal Waterway located along the Gulf Coast of the United States. It is a navigable inland waterway running approximately 1,050 miles from Carrabelle, Florida, to Brownsville, Texas. The waterway provides a channel with a controlling depth of –12 feet MLLW (with 2 feet of allowable overdepth and 2 feet of advanced maintenance), designed primarily for barge and towboat transportation.

The GIWW is located in the Mississippi Sound. Large portions of the Mississippi Sound reach depths of –20 feet MLLW. The GIWW route through the Sound, for the most part, is undefined with water depths exceeding the minimum project requirement. Two shallower sections, one west of Cat Island and one north of Dauphin Island, require maintenance dredging and have ATONs.

3.5.2.3 Barrier Islands

The barrier islands, Cat, Ship, Horn, and Petit Bois, separating the Sound from the Gulf are part of the National Park Service's Gulf Islands National Seashore (GUIS). The islands' natural wilderness offers day visitors and overnight campers unique opportunities. The islands are essentially pure sand, shaped into dune-covered stretches and wide sand beaches. The Mississippi barrier islands are a year-round destination for boaters, fishermen, and nature enthusiasts. They offer particularly unique destinations for campers, hikers, and kayakers (Marsh 2011).

3.5.2.4 Shipping Channels

Cargo ships access the Port of Pascagoula via shipping channels from international waters in the Gulf of Mexico, then through the upper and lower portions of the Mississippi Sound. Cargo vessels travel from the Pascagoula port's harbors across the Mississippi Sound via the Pascagoula Upper Sound and the Bayou Casotte channels, and then through the Horn Island Pass, between Horn Island and Petit Bois Island. The Pascagoula Bar Channel provides access to the safety fairway south of the barrier islands. Soundings within the safety fairway are generally in excess of –42 feet MLLW. Depths from surveys by the USACE hydrographic report dated March 2011 and surveys from October 2010 to March 2011 are shown on the subsection of NOAA's Nautical Chart 11373, Mississippi Sound and Approaches (NOAA 2011a) (Figure 3.3-1), and listed on Table 3.5-1.

Table 3.5-1
Horn Island Pass, Pascagoula Harbor and Bayou Casotte Channels
Controlling Depths from Seaward in feet at MLLW

Channel	Left Outside Quarter	Middle Half of Channel	Right Outside Quarter	Date of Survey (year-mo)	Project* Width (feet)	Project* Depth (MLLW feet)
Pascagoula Bar Channel	38.2	44.0	41.6	10-Oct	450	44.0
Horn Island Pass	40.9	42.1	33.5	11-Feb	600	44.0
Pascagoula Upper Sound	37.9[A]	42.0	38.4	10-Nov	350	42.0
Pascagoula Lower Sound	32.1	32.1	34.5	10-Nov	350	38.0
Pascagoula River	33.1[B]	33.1[C]	31.4[D]	11-Mar	350[E]	38.0
Bayou Casotte	36.6	41.4[F]	35.5	10-Oct	350	42.0

* Project refers to individual channel projects
[A] Shoaling to 34.9 feet at bend widening area.
[B] Shoaling to 31.8 feet at CSX railroad bridge.
[C] Shoaling to 19.9 feet at CSX railroad bridge.
[D] Shoaling to 25.4 feet at CSX railroad bridge.
[E] Pascagoula River Project* width varies at south end of terminal C to CSX railroad.
[F] Shoaling to 39.2 feet at north end of project.
Source: NOAA Nautical Chart No. 11373 (NOAA 2011a).

3.5.2.5 Winds, Visibility, and Tides

Prevailing spring and summer winds along the Mississippi coast are generally from the east and southeast. During fall and winter, the winds prevail from the east and northeast. This circulation is the result of a high pressure ridge, the Bermuda High, centered over the Bermuda-Azores in the Atlantic and a thermal low from Mexico. The Bermuda High is a semi-permanent, subtropical area of high pressure in the North Atlantic Ocean off the east coast of North America that moves east and west with varying central pressure. The Mexico Heat Low is a thermal low area of low atmospheric pressure near the earth's surface.

Wind data gathered at the United States Air Force 14th Weather Squadron shows the strongest non-storm/hurricane driven winds during February and March and also show that wind speeds rarely exceed 25 knots. The station at Keesler is located between and within a mile of both the Mississippi Sound and the Biloxi Back Bay. Winds from the north at Keesler prevail from the northeast quadrant and those from the south range broadly between south-southwest to south-southeast, with only slight directional distinction from the southwest. Mobile tends to have somewhat higher wind speeds than those recorded at Keesler and prevail from the northwest and southeast quadrants (USACE 2011a). Pascagoula Bar Pilots Association guidelines require special handling of vessels when wind speeds approach 30 knots. (Pascagoula Bar Pilots Association 2011) Data collected from weather stations at Keesler and Mobile indicate visibility of less than 1 mile might be expected about 10 percent of evenings and mornings during the winter months (USACE 2011a).

The tidal variation in the Mississippi Sound and adjacent waters is diurnal with an average tide cycle of 24.8 hours. Although the astronomical tidal range is relatively small, winds can induce larger variations. Strong winds blowing from the north can force water out of the Sound and increase current velocities to several knots in the passes. The reverse occurs with winds blowing from the southeast, which forces water shoreward toward the Mississippi coastline (USACE 2011a).

3.5.3 Port Facilities and Traffic

The Port of Pascagoula is the oldest industrial port on the Mississippi Gulf Coast, established by the Mississippi State Legislature in 1956. Port operations and development are managed by the JCPA (JCPA 2011). The JCPA is also responsible for management of the waterways leading into the two harbors that comprise the Port of Pascagoula, including traffic control, channel and facility maintenance coordination and enforcement of port tariff regulations.

Access to port and marine facilities is provided via a federally maintained navigation channel. Several private industries operate facilities and use the harbors within the Port of Pascagoula. Private industries in Bayou Casotte Harbor include Chevron Pascagoula Refinery, MPC, First Chemical Corp., VT Halter Marine, Gulf LNG, and Signal International. The Pascagoula River Harbor is shared with Signal International and Ingalls Shipbuilding (JCPA 2011).

3.5.3.1 Cargoes, Imports, and Exports

The Port owns and operates public cargo facilities in two channels: Pascagoula River Harbor and Bayou Casotte Harbor. The Port has nine deepwater berths and one barge berth. The Pascagoula River Harbor has five of the deepwater berths, 500 to 732 feet in length, covered storage areas, and cold storage/freezer areas. An additional 50 acres of land is available for open storage. Bayou Casotte Harbor has the other four deepwater berths, 516 to 737 feet in length, a barge berth, 350,000 square feet of covered storage area, 50,000 square feet of paved open storage area, and 10 acres of unpaved open storage area. The Port is public, though most facilities are operated through leases, operating agreements, or space assignment agreements with private operators or users (JCPA 2011).

Typical export cargo includes forest/paper products, frozen poultry, petroleum products, fertilizer, chemicals, and project cargo (JCPA 2011). In 1999, exports were valued at $332.16 million (Couvillion and Allen 2001). Import cargo includes forest products, crude oil, phosphate rock, chemicals, and aggregate (JCPA 2011). Imports were valued at $1,689 million in 1999 (Couvillion and Allen 2001).

The Port of Pascagoula has a variable commodity base. Inbound cargo includes forest products, crude oil, phosphate rock, chemicals and aggregate. Outbound cargo includes forest products, paper products, frozen poultry, petroleum products, fertilizer chemicals and project cargo. Total commodity traffic, domestic and foreign, from 2005 to 2009, is summarized in Table 3.5-2.

Table 3.5-2
Port of Pascagoula Commodities Traffic, 2005 to 2009
All Traffic Types (Domestic and Foreign), in Tons

Year	All Traffic	Receipts	Shipments	Intraport
2009	36,617,585	22,879,213	13,707,593	30,779
2008	33,589,817	21,060,916	12,527,649	1,252
2007	35,195,425	21,376,081	13,816,769	2,575
2006	37,651,727	22,169,177	15,482,550	0
2005	29,323,586	17,876,314	11,440,386	6,886

Source: USACE Navigation Data Center 2011.

The JCPA reports that petroleum and petroleum products makes up the majority of cargo in the Port. On average, foreign cargo makes up 67.6 percent of all cargo, of which 88 percent is petroleum or petroleum products. Eighty-two percent of the domestic cargo that makes up the remaining 32.4 percent of all cargo is petroleum or petroleum products. The combined petroleum and related products make up over 86 percent of all Port cargo. A significant portion of the petroleum and petroleum products tonnage forecasted throughout their period of analysis is anticipated to be transported through the Chevron facility. The facility is undergoing expansion to accommodate future growth, including construction of an additional berth. Chevron also has expansion plans for the crude and products shipping lines anticipated to be completed in 2013.

Angola LNG has constructed a 5.73-million-ton (5.2-million-metric-ton) liquefaction facility on the Congo River in northern Angola. The facility is scheduled to come online in mid-2012. At that time, Angola LNG will begin calling a dedicated fleet of seven newly constructed vessels on Bayou Casotte. Angola LNG has purchased 60 percent of the total 1.3 billion cubic feet per day capacity of the Gulf LNG terminal currently being constructed at Bayou Casotte. In 2012, Angola will begin calling on the facility every 4 to 5 days, reaching around 70 to 80 calls annually. The remaining 40 percent of capacity located at Gulf LNG has been leased by ENI (an Italian-based company). ENI has facilities throughout the world; however, they have not yet provided JCPA with their expansion plans for the Port.

Records for both domestic and foreign petroleum products at the Port indicate a rising trend from 1998 to 2010. Additionally, Department of Energy (DOE) projections indicate both will grow at an annual rate of approximately 1.25 percent through 2046. Figures 3.5-1 and 3.5-2 illustrate these trends.

3.5.3.2 Pascagoula River Harbor Facilities

The Pascagoula River Harbor includes a combination of public and private terminals. Over 3,000 feet of wharf are available in public terminals. Facilities are listed below.

- Public Terminals
  - A – 500-foot wharf transit warehouse/freezer
  - B – 544-foot wharf, 145,000-square-foot covered storage
  - C – 718-x-187-foot open wharf, cold storage/freezer
  - D – 732-foot wharf, 158,550-square-foot covered storage
  - South Terminal – 825-foot wharf, 50+ acres
  - Cold storage facilities
- Private Terminals
  - Ingalls Shipbuilding
  - Signal International, LLC (West yard)

3.5.3.3 Bayou Casotte Harbor Facilities

The Bayou Casotte Harbor also offers a mix of public and private terminal space. Public wharfs in excess of 2,000 linear feet are available along with numerous private industry facilities.

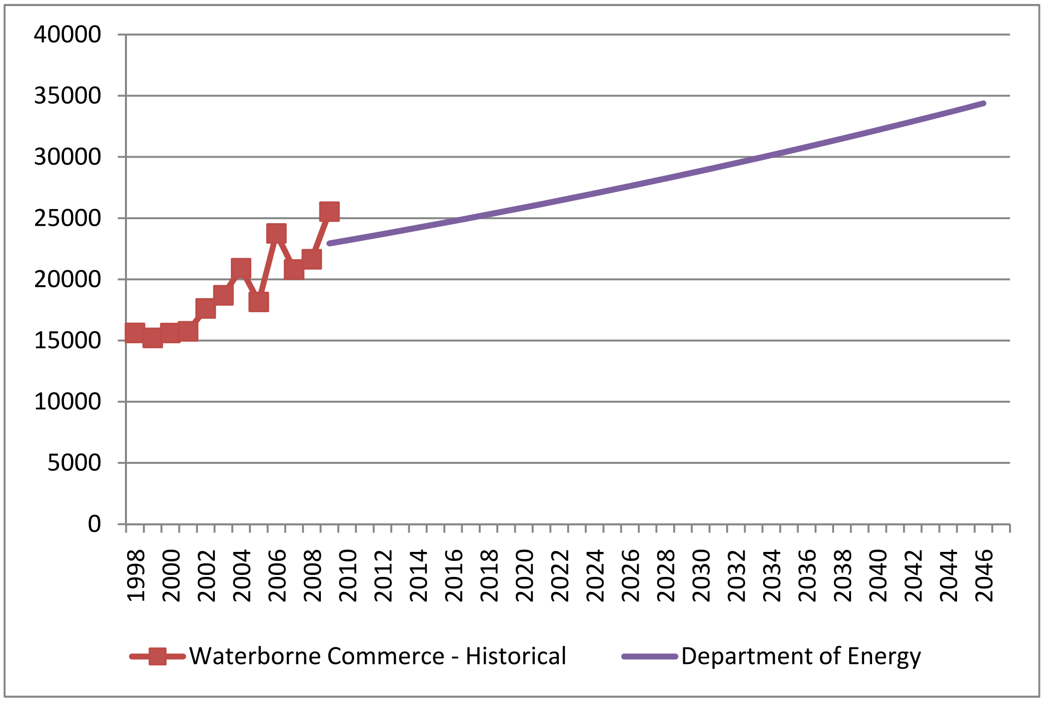


Figure 3.5-1
Petroleum Products – Foreign Cargo (thousand short tons)
(Source: Jackson County Port Authority)

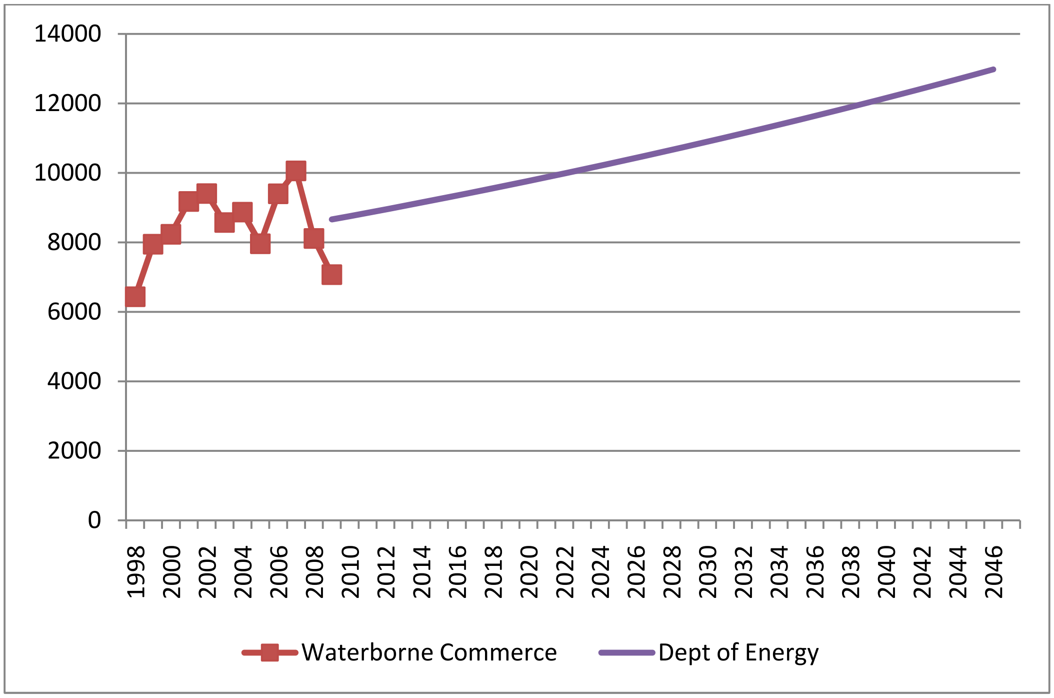


Figure 3.5-2
Petroleum Products – Domestic Cargo (thousand short tons)
(Source: Jackson County Port Authority)

- Public Terminals
  - E – 517-linear feet of wharf, 175,000-square-foot transit warehouse (shared with Terminal F)
  - F – 737-linear feet wharf, transit warehouse/marginal rail track
  - G – 516-linear feet wharf, 175,000-square-foot transit warehouse (shared with Terminal H)
  - H – 556-linear feet wharf, transit warehouse
  - G – Extension, barge berth

- Private Terminals
  - Chevron Pascagoula Refinery (Chevron Shipping Co.)
  - Mississippi Phosphates Corporation
  - Signal International, LLC (East yard)
  - VT Halter Marine
  - Gulf LNG Energy, LLC
  - First Chemical Corporation

3.5.3.4 Commercial Vessel Traffic Drafts

The USACE Navigation Data Center collects data on cargo laden vessel traffic based upon both traffic passing through the Mississippi Sound to the shipping channels and traffic passing through the Sound via the GIWW. Traffic counts are measured as foreign and domestic cargo movements, outbound and inbound, by type of vessel and vessel draft. For purposes of this assessment, foreign/domestic and outbound/inbound have been combined.

The data indicate that the vast majority of traffic takes place outside of the well defined channels, that is, within the GIWW, and within this group, over 40 percent draft in less than 5 feet of water and 50 percent draft in 6 to 9 feet. Both of these categories represent self-propelled dry cargo and tankers. Only 6 percent of the vessels were towboats and less than 1 percent barges. The majority of the vessels (by type) were self-propelled dry cargo (37 percent) followed by non-self propelled dry cargo (27.2 percent), non-self propelled tanker liquid barge (17.8 percent), self-propelled towboat (17.9 percent) and self-propelled tanker (0.0 percent) (USACE Navigation Data Center 2011) (Table 3.5-3).

Vessel traffic in the lower portions of the Dog River, Pascagoula River, Mississippi Sound, Bayou Casotte, and Horn Island Pass channels totaled 7,230 vessels, compared with 37,046 vessels in the GIWW. Of these, 24.4 percent (or 1,764) drafted at 5 feet or less, 41.0 percent at 6 to 9 feet, and 5.9 percent drafted at 27–29 feet. A total of 3.5 percent drafted at depths of 39 to 40 feet (tables 3.5.3 and 3.5.4).

Table 3.5-3
Pascagoula (Commercial) Trips by Draft/Vessel Type 2009
All Traffic Types (Domestic & Foreign)
Included: Lower Portions of Dog River and Pascagoula River,
Mississippi Sound Channel, Bayou Casotte and Horn Island Pass Channels
(in number of trips)

Draft	All Vessel Types	Percent by Draft	Self Propelled Dry Cargo	Self Propelled Tanker	Self Propelled Towboat	Non-Self Propelled Dry/Liquid
0–5 feet	1,764	24.4	245	1	107	1,411
6–9 feet	2,962	41.0	97	1	1,717	1,147
10–12 feet	674	9.3	42	1	243	388
13–14 feet	100	1.4	5	0	2	93
15–17 feet	140	1.9	74	20	37	9
18–20 feet	312	4.3	87	14	184	27
21–23 feet	88	1.2	53	15	0	20
24–26 feet	154	2.1	86	57	0	11
27–29 feet	429	5.9	69	329	0	31
30–32 feet	117	1.6	29	47	0	41
33–35 feet	92	1.3	9	47	0	36
36–38 feet	145	2.0	23	122	0	0
39–40 feet	253	3.5	42	211	0	0
41 feet	0	0.0	0	0	0	0
42 feet	0	0.0	0	0	0	0
Percent by Vessel Type	–	100	12	12	32	44
All Drafts	7,230	–	861	865	2,290	3,214

Source: USACE Navigation Data Center 2011.

Table 3.5-4
Gulf Intracoastal Waterway Commercial Traffic by Vessel Type, 2009
All Traffic Types (Domestic & Foreign)
Measure: Trips (#)

Draft	Total Trips	Percent by Draft	Self-Propelled Dry Cargo	Self-Propelled Tanker	Self-Propelled Towboat	Non-Self-Propelled Dry Cargo	Non-Self-Propelled Liquid Barge
0–5 feet	16,080	43.4	7,697	0	300	4,940	3,143
6–9 feet	18,580	50.2	6,009	3	5,698	4,485	2,385
10–12 feet	2,183	5.9	11	0	559	632	981
13–14 feet	198	0.5	3	0	83	29	83
15–17 feet	5	0.0	0	0	5	0	0
Percent by Vessel Type	–	100	37.0	0.0	17.9	27.2	17.8
All Drafts	37,046	–	13,720	3	6,645	10,086	6,592

Source: USACE Navigation Data Center 2011.

3.5.3.5 Pascagoula River Harbor and Bayou Casotte Harbor Traffic

The Port of Pascagoula maintains records on commercial vessel traffic transiting to and from the Pascagoula River Harbor and the Bayou Casotte Harbor. During the calendar year 2010, a total of 3,447 vessels visited the two harbors of the Port of Pascagoula. Doubling the figures to account for inbound and outbound movements, a total of 6,894 vessel transits were made through the channels leading to the Port. The types of vessels and their respective numbers of trips are presented in Table 3.5-5. Barges make up 45 percent of the vessel traffic followed by 32 percent for the tugs that propel the barges and guide other vessels into port. The oil tankers accounted for nearly 14 percent of the remaining traffic. Of the total vessel trips to the Port, 5,598 vessel trips were to the Bayou Casotte Harbor with the remaining 1,296 trips destined to Pascagoula River Harbor, indicating that 81 percent of all vessel traffic at the Port is served by Bayou Casotte Harbor.

Table 3.5-5
Vessel Trips by Type and Harbor, 2010
(in number of trips each way)

Vessel Type	Bayou Casotte Harbor	Pascagoula Harbor	Total Port	Percent of Total
Barge	2,498	604	3,102	45.0
Bulk Carrier	90	0	90	1.3
Bulk/Container Carrier	2	0	2	0.0
Bulk/Oil Carrier	12	0	12	0.2
Chemical Tanker	10	0	10	0.1
Chemical/Oil Products Tanker	26	0	26	0.4
Drilling Ship	2	0	2	0.0
General Cargo	78	84	162	2.3
General Cargo Ship	22	50	72	1.0
Heavy Load Carrier	0	8	8	0.1
Liquid Gas Carrier	38	0	38	0.6
Liquid Petroleum Gas Tanker	4	0	4	0.1
Offshore Supply Ship	4	4	8	0.1
Offshore Support Vessel	2	2	4	0.1
Oil Products Tanker	464	2	466	6.8
Oil Tanker	454	0	454	6.6
Other Activities	0	6	6	0.1
Other Non-Merchant Ships	6	18	24	0.3
Other/Non Trading	8	104	112	1.6
Refrigerated Cargo Ship	0	56	56	0.8
Research Vessel	0	10	10	0.1
Research/Survey	2	8	10	0.1
Tug	1,876	340	2,216	32.1
Total Vessel Trips by Harbor	5,598	1,296	6,894	100.0
Percent Vessel Trips	81.2%	18.8%	100.0%	–

Source: Mears 2011.

The Port also documents each vessel by LOA and the total length, including any object protruding from the bow or the stern. Analysis of these figures indicates maximum lengths of 822 feet for oil tankers in Bayou Casotte Harbor and 654 feet for heavy load carriers in the Pascagoula River Harbor. By far, the largest vessels accessed the Bayou Casotte Harbor. Table 3.5-6 presents the vessels by maximum and average LOA for each harbor.

Table 3.5-6
Length Overall (LOA) by Harbor, 2010
(in feet)

	Bayou Casotte Harbor		Pascagoula Harbor	
Vessel Type	Max LOA	Avg LOA	Max LOA	Avg LOA
Barge	655	307	455	265
Bulk Carrier	738	720	-	-
Bulk/Container Carrier	738	738	-	-
Bulk/Oil Carrier	803	786	-	-
Chemical Tanker	587	581	-	-
Chemical/Oil Products Tanker	672	508	-	-
Drilling Ship	550	550	-	-
General Cargo	738	594	477	446
General Cargo Ship	22	606	462	444
Heavy Load Carrier	-	-	654	654
Liquid Gas Carrier	643	579	-	-
Liquid Petroleum Gas Tanker	571	571	-	-
Offshore Supply Ship	265	210	255	248
Offshore Support Vessel	149	149	166	166
Oil Products Tanker	820	600	422	422
Oil Tanker	822	801	-	-
Other Activities	-	-	592	592
Other Non-Merchant Ships	315	273	567	274
Other/Non Trading	517	316	517	263
Refrigerated Cargo Ship	-	-	502	452
Research Vessel	-	-	209	157
Research/Survey	122	122	190	164
Tug	245	86	194	80
LOA by Harbor	822	313	654	246

Source: Mears 2011.

Vessel weights are recorded as the gross register tonnage or GRT. GRT is a ship's total internal volume and represents the total permanently enclosed capacity of the vessel. It does not indicate the ship's weight or displacement which is usually expressed as its deadweight tonnage or displacement. These figures, provided in Table 3.5-7, indicate that Bayou Casotte Harbor supports the vessels with the greatest GRT, as expected (Mears 2011).

Table 3.5-7
Gross Register Tonnage by Harbor, 2010
(in tons)

	Bayou Casotte Harbor		Pascagoula Harbor	
	Maximum GRT	Average GRT	Maximum GRT	Average GRT
Barge	26,573	1,670	9,928	457
Bulk Carrier	42,785	38,505	-	-
Bulk/Container Carrier	38,995	38,995	-	-
Bulk/Oil Carrier	46,191	44,792	-	-
Chemical Tanker	23,519	23,324	-	-
Chemical/Oil Products Tanker	36,459	16,568	-	-
Drilling Ship	14,058	14,058	-	-
General Cargo	42,647	25,360	12,750	10,314
General Cargo Ship	39,737	24,105	12,750	10,339
Heavy Load Carrier	-	-	31,027	31,027
Liquid Gas Carrier	34,346	24,361	-	-
Liquid Petroleum Gas Tanker	22,954	22,954	-	-
Offshore Supply Ship	2,174	1,235	2,983	2,633
Offshore Support Vessel	99	99	199	199
Oil Products Tanker	62,385	28,631	8,542	8,542
Oil Tanker	67,032	55,957	-	-
Other Activities	-	-	23,123	23,123
Other Non-Merchant Ships	8,612	6,871	9,000	2,833
Other/Non Trading	11,856	5,211	14,500	4,340
Refrigerated Cargo Ship	-	-	12,634	7,386
Research Vessel	-	-	2,139	915
Research/Survey	98	98	1,767	899
Tug	9,242	242	9,928	447
GRT by Harbor	67,032	9,236	31,027	2,437

Source: Mears 2011.

Daily vessel trips for the year 2010 indicate that vessel traffic is dispersed relatively equally throughout the year. Average arrival times for the Bayou Casotte Harbor and the Pascagoula River Harbor are essentially the same, at about 1300 hours, or 1:00 PM. Similarly, sail times for both harbors average 1000 hours, or 10:00 AM.

3.5.3.6 Vessel Fleet Forecast

Without the proposed project, JCPA's analysis of cargo demand projections and subsequent vessel traffic resulted in the following conclusions:

> "There have been over 8,700 calls, or approximately 2,900 per year, in the past three years from April '08 to April '11. Of those calls, around 48 percent were tugs entering/exiting through the Gulf Intracoastal Waterway (GIWW). Of the remaining vessels, about 36 percent call with a length overall greater than or equal to 700 feet.

Under the without project condition, vessels will continue to operate using the same transit restrictions currently in place for the existing condition. Therefore, 36 percent of the deep draft vessel fleet calling on Pascagoula Harbor will be restricted to daylight only transits. This percentage was held constant throughout the period of analysis; however, with the size of new-build vessels becoming larger every year, it is possible that the number of deep draft vessels being delayed could increase. However, for this analysis, since the terminals/berths do not have current plans for expansion (excludes new berth being constructed at the Chevron terminal), vessel are anticipated to remain relatively consistent with the existing condition. Also, all deep-draft vessels will continue to be restricted to one-way traffic as those vessels are not allowed to meet within the channel system. This does not include the tug transits that call on the harbor. All vessels will continue to be restricted by weather-related conditions and any tide restriction as well.

Using the commodity forecasts provided in the Port Commerce section of the report and assuming vessels will continue to load in a similar fashion as the existing condition, since deepening is not being evaluated, a future fleet forecast was developed. The future fleet forecast was developed using the base fleet as the starting point. The following tables provide the anticipated vessel fleet for the future in 10-year increments for the first 30 years of the period of analysis, starting with the base year of the project, 2017. Table 3.5-8 displays vessels carrying petroleum products while Table 3.5-9 provides the remaining fleet. Table 3.5-10 is the total remaining fleet. As with the commodity forecast, the vessel fleet forecast remains constant in the analysis after a 30-year period to remain conservative and reduce the risk and uncertainty of the proposed project.

The estimated future vessel fleet was run through the HarborSym widening model to calculate the transiting times and costs for the period of analysis for each of the ten-year increments (2017, 2026, 2036, and 2046) evaluated. Once the transiting times were calculated, they were presented to the harbor pilots and the Non-Federal sponsor to ensure that the outputs seemed reasonable. In this case, pilot judgment was critical due to the increase in traffic in the future. Both the pilots and the port authority provided positive feedback regarding the modeling results. The outputs from the HarborSym model for the without-project/existing condition, along with additional detail about the model itself, is provided in the with-project section of the report.

In addition to the current fleet calling on Pascagoula Harbor, Angola LNG is anticipated to begin calling on the Gulf LNG Energy terminal in mid-2012. The LNG vessel fleet will consist of seven new tankers specifically built to transit between Soyo, Angola, and Pascagoula Harbor. Four vessels are being constructed by Samsung (SHI) in Korea and chartered to Supply Services on a long-term basis from a joint venture comprising Mitsui & Co., NYK Lines, and Teekay Shipping. The remaining three vessels are being constructed by Daewoo (DSME) in Korea and chartered to Supply Services on a long-term basis from Sonangol Shipping Holding Ltd. Chevron Shipping is the operator for Sonangol Shipping. These 165,000 bcm vessels have a length overall of 954 feet (meaning these vessels will be restricted to daylight traffic only throughout the period of analysis), beam width of 142 feet, and design draft of 39 feet. These seven vessels will service only this trade route to ensure that the facility in Soyo, Angola, does not have to cease operations at any time. These vessels are anticipated to make between 70 and 80 calls per year (officially 72) or one call every 4 to 5 days."

Table 3.5-8
Vessel Fleet Forecast – Oil Tankers/Oil Product Tankers

			Year			
	LOA	Base Fleet	2017	2026	2036	2046
Petroleum Vessels, Foreign Projected						
Oil Products	450	15	21	27	35	44
Oil Products	600	77	93	112	135	161
Oil Tanker	650	4	5	6	7	8
Oil Products	715	78	86	96	108	121
Oil Tanker	780	43	47	51	56	62
Oil Tanker	815	124	132	142	154	167
Sum		341	384	434	495	563
Petroleum Vessels, Domestic Projected						
Oil Products	450	3	5	6	7	9
Oil Products	600	17	21	25	30	36
Oil Tanker	650	1	2	2	2	2
Oil Products	715	17	19	21	24	27
Oil Tanker	780	9	10	11	12	13
Oil Tanker	815	27	29	31	34	37
Sum		74	86	96	109	124
Petroleum Vessels, Total Projected						
Oil Products	450	18	26	33	42	53
Oil Products	600	94	114	137	165	197
Oil Tanker	650	5	7	8	9	10
Oil Products	715	95	105	117	132	148
Oil Tanker	780	52	57	62	68	75
Oil Tanker	815	151	161	173	188	204
Sum		415	470	530	604	687

Source: JCPA 2012.

Table 3.5-9
Vessel Fleet Forecast – All Commodities (Foreign/Domestic)
Excludes Petroleum

	LOA	Base Fleet	Year 2017	2026	2036	2046
Foreign						
General Cargo/General Cargo Ship		203	227	252	282	316
	430	91	106	123	144	166
	500	75	82	89	97	107
	650	37	39	40	41	43
Bulk Carrier		50	52	52	54	54
	590	12	13	13	14	14
	750	38	39	39	40	40
Refrigerated Cargo Ship		41	46	50	56	62
	410	14	17	19	22	25
	510	27	29	31	34	37
Miscellaneous Class		90	105	121	140	160
	165	33	42	51	63	75
	280	41	46	52	59	66
	625	16	17	18	18	19
Foreign Total		384	430	475	532	592
Domestic						
General Cargo/General Cargo Ship		43	57	71	89	108
	430	19	28	37	49	62
	500	16	20	24	29	34
	650	8	9	10	11	12
Bulk Carrier		10	12	12	12	13
	590	2	3	3	3	3
	750	8	9	9	9	10
Refrigerated Cargo Ship		8	11	13	17	19
	410	3	5	6	8	9
	510	5	6	7	9	10
Miscellaneous Class		20	29	39	50	61
	165	7	12	18	24	31
	280	9	12	16	20	24
	625	4	5	5	6	6
Domestic Total		81	109	135	168	201

Source: JCPA 2012.

Table 3.5-10
Vessel Fleet Forecast – All Commodities (Total)
Excludes Petroleum

			Year			
	LOA	Base Fleet	2017	2026	2036	2046
General Cargo/General Cargo Ship		246	284	323	371	424
	430	110	134	160	193	228
	500	91	102	113	126	141
	650	45	48	50	52	55
Bulk Carrier		60	64	64	66	67
	590	14	16	16	17	17
	750	46	48	48	49	50
Refrigerated Cargo Ship		49	57	63	73	81
	410	17	22	25	30	34
	510	32	35	38	43	47
Miscellaneous Class		110	134	160	190	221
	165	40	54	69	87	106
	280	50	58	68	79	90
	625	20	22	23	24	25
Total		465	539	610	700	793

Source: JCPA 2012.

3.5.3.7 Charter Fishing Vessels and Recreational Boaters

The GIWW supports considerable commercial activity but is also used extensively by recreational boaters, who with their shallow draft vessels enjoy nearly full access throughout the Sound without the need to navigate marked channels. The waterway is used by traffic moving south in the winter and north in the summer. The waterway also provides calmer waters to traverse when the ocean is rough.

Commercial (charter) fishing vessels and the private recreational boater traffic are not included in the USACE Navigation Data Center data provided in the figures and tables in subsection 3.5.3.5. Commercial fishing numbers are expected to be greatest within the Sound. Similarly, recreational boaters, with their interests in watersports, fishing and traveling to and from the barrier islands would be heaviest in the Sound.

In 2010, there were over 191,000 registered boaters in Mississippi (Isaacs and Lavergne 2010). The Mississippi State University Coastal Research and Extension Center prepared the Mississippi

Recreational Boating Access Assessment and Projected Needs report (Burrage et al. 1999), a portion of which is presented below.

> There was an overall 42 percent increase in boat registrations between 1992 and 1999. Most (72 percent) of the 65.5 thousand boats registered in the six-county area were registered in Jackson and Harrison counties, in correspondence with the proportionate population base. About 96 percent of the boats registered in the six coastal counties were less than 26 feet in length, indicating that most boats in the region were capable of being stored or transported on a trailer. About 45 percent (29.6 thousand) of the boats in the region are used primarily in salt water. Because recreational boats over 5 tons may be documented rather than state registered, the number of registered boats given for the larger size categories is less than the actual number of boats of that size in the region.

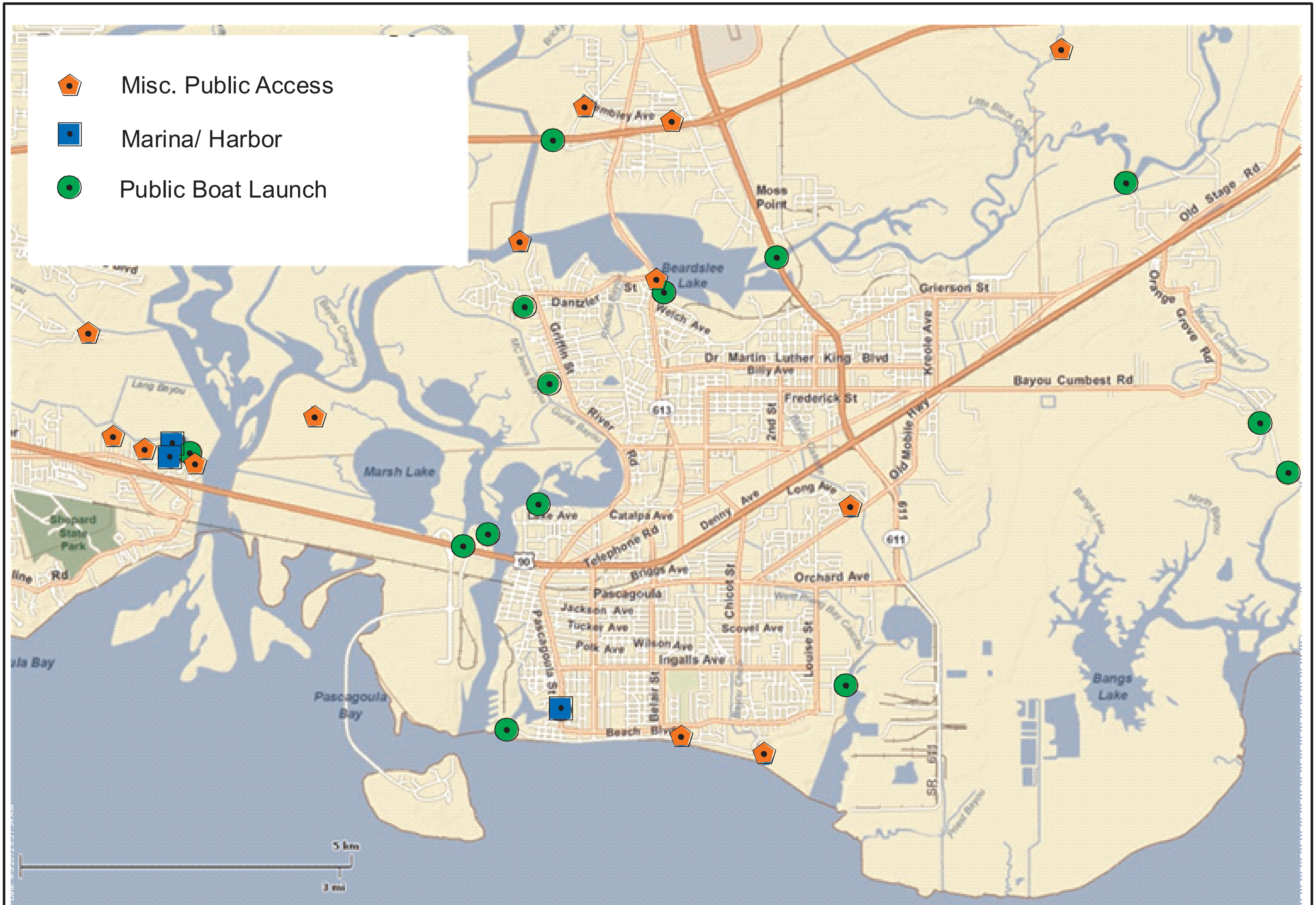
A trend similar to the one from 1999 until Hurricane Katrina and afterwards may continue. However, Hurricane Katrina (in 2005) had a devastating impact on Mississippi coastal communities causing dramatic changes to boating facilities. The Southern Mississippi Planning and Development Council conducted a post-Katrina inventory and assessment of public access sites in Hancock, Harrison, and Jackson counties, Mississippi (Figure 3.5-3). A summary of findings indicates one boat ramp in the vicinity of the Pascagoula River Harbor and eight other boat ramps upriver of the harbor. Additionally, private marinas may be servicing the same area.

Deep water boat harbors and ramps are well distributed along the Mississippi Sound coasts and preclude the need for recreational charter fishing boats to congregate in navigation channels. On weekends, an estimated 60 to 70 percent of registered Mississippi boats are in the Sound. There is considerably less boat traffic during the week.

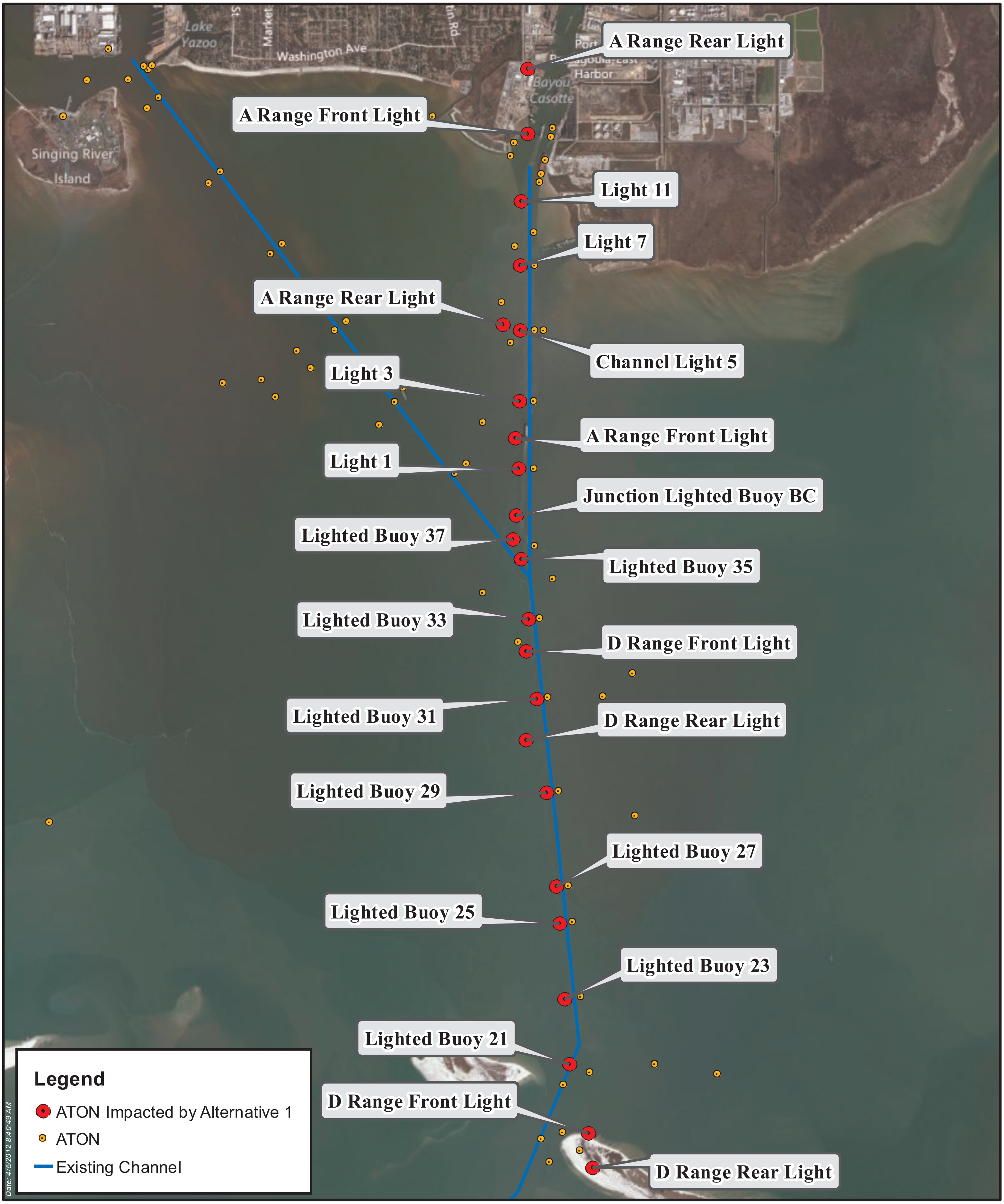
3.5.4 Aids to Navigation

The Port of Pascagoula utilizes the U.S. ATON System, which is operated and administered by the USCG. These aids are defined (USDHS and USCG 2005) as a group of interacting external reference devices intended to collectively provide sufficient and timely information with which to safely navigate within and through a waterway when used in conjunction with updated nautical charts and other commonly available material (Table 3.5-8). The system includes all navigation devices within visual, audio, or radar range of the mariner.

The USCG Light List, Volume IV, Gulf of Mexico (USCG 2011b), provides a current list of the ATON lights and markers along the channel. Lights and other marine ATONs, maintained by, or under authority of, the USCG and located on waters used by general navigation, are described in the Light List. Included are all USCG-maintained ATONs used for general navigation such as lights, sound signals, buoys, day beacons, ranges, and other ATONs. Figures 3.5.4 and 3.5.5 illustrate a portion of the channel with the navigation aids impacted by each alternative. Not included are some buoys



US Army Corps of Engineers Mobile District Figure 3.5-3	**Public Access Sites** (Source: Southern Mississippi Planning and Development Council, Department of GIS, 2011)	Bayou Casotte Harbor Improvement Project



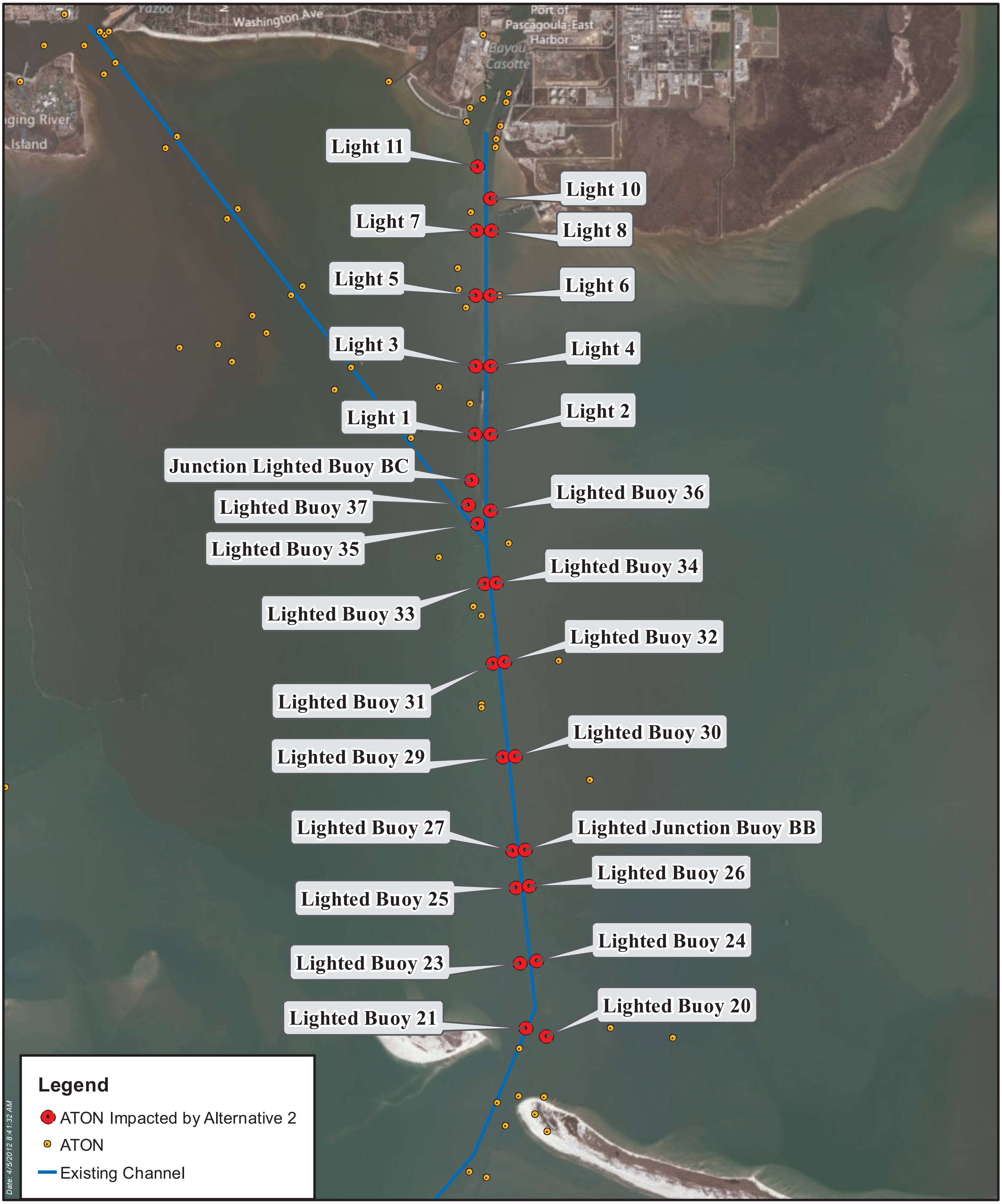
US Army Corps of Engineers
Mobile District

Figure 3.5-4

Federal Aids to Navigation (ATON) Impacted by Alternative 1

Bayou Casotte Harbor Improvement Project

0 1 2 Miles



US Army Corps of Engineers
Mobile District

Figure 3.5-5

Federal Aids to Navigation (ATON) Impacted by Alternative 2

Bayou Casotte Harbor Improvement Project

0 1 2 Miles

having no lateral significance, such as special purpose, anchorage, fish net, and dredging activities. Privately maintained ATONs that are included are known as Class I ATONs on marine structures or other works, which the owners are legally obligated to establish, maintain, and operate as prescribed by the USCG and Class II ATONs exclusive of Class I, located in waters used by general navigation. Navigational aids included in the Light List are also illustrated on the NOAA Nautical Chart.

The Light List indicates the type, method of mooring, and ownership. Types included in the project are lights or beacons, buoys and ranges. Lights or beacons are fixed structures, generally on pilings where water depths are shallow, up to about the 15-foot depth. Buoys are floating, typically anchored to the bottom with a chain, cable, or nylon line connected to a concrete block. Both mark channel boundaries, hazards, and channel changes of direction. Both lights and buoys may be mounted with high-intensity flashing lights. Fixed lights are equipped with dayboards painted with patterns and colors to delineate port and starboard sides of the channel, indicate vessel transit restrictions, and mark hazards. Buoys may be similarly equipped with dayboards or the buoy itself is painted with navigational instructions.

Ranges are pairs of fixed structures aligned with the channel centerline at one or both ends of straight reaches. They are usually on shore or in very shallow water, mounted high above the water on piles or wooden or metal skeleton-like tower structures. The rear marker is always higher than the front marker. They are typically marked with rectangular signs, designated by letters, high-intensity lights, and red and white vertical stripes. By observing the placement of front and rear markers relative to each other, mariners can determine vessel position relative to the channel centerline.

The lights listed along the Bayou Casotte Channel are mostly pile mounted and located 110 to 170 feet outside of the channel limits. Range lights are mostly skeleton towers on piles. A number of private lights are also listed as pipeline crossings, the USGS mooring platform, the LNG docks and jetties. The lights in the Pascagoula Channel are similarly moored on piles and dolphins and offset from the channel. The Horn Island Pass lights are buoy mounted.

3.6 AIR QUALITY

The Clean Air Act (CAA), last amended in 1990, regulates air emissions from area, stationary, and mobile sources. The CAA requires the EPA to establish National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The CAA establishes two types of national air quality standards. Primary standards define the maximum levels of air quality that the EPA ascertains necessary, with an adequate margin of safety, to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly. Secondary standards define the maximum levels of air quality that the EPA judges necessary to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings. Air quality is generally considered acceptable if pollutant levels are lower or equal to these established standards on a continuing basis.

The EPA has set NAAQS for seven principal pollutants, called "criteria" pollutants. They are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), inhalable particulate matter with an aerodynamic diameter less than or equal to a nominal 10 microns (PM_{10}), fine particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 microns ($PM_{2.5}$), and sulfur dioxide (SO_2). The NAAQS are further defined in 40 C.F.R. Part 50.

CO is a colorless and practically odorless gas primarily formed when carbon in fuels is not burned completely. Transportation activities, indoor heating, industrial processes, and open burning are among the anthropogenic (man-made) sources of CO.

NO_2, nitric oxide (NO), and other oxides of nitrogen are collectively called nitrogen oxides (NO_X). These species are interrelated, often changing from one form to another in chemical reactions. NO_2 is the species commonly measured in ambient air monitors. NO_X are generally emitted in the form of NO, which is oxidized to NO_2. The principal anthropogenic sources of NO_X are fuel combustion in motor vehicles and stationary sources such as boilers and power facilities. Reactions of NO_X with other atmospheric chemicals can lead to the formation of O_3.

Ground-level O_3 is a secondary pollutant, formed from daytime reactions of NO_X and volatile organic compounds (VOCs) rather than being directly emitted by natural and anthropogenic sources. VOCs, which have no NAAQS, are released in industrial processes and from evaporation of organic liquids such as gasoline and solvents. Ozone contributes to the formation of photochemical smog.

Pb is a heavy metal that may be present as dust or as a fume. Dominant industrial sources of Pb emissions include waste oil and solid waste incineration, iron and steel production, lead smelting, and battery and lead alkyl manufacturing. The lead content of motor vehicle emissions, which was the major source of lead in the past, has significantly declined with the widespread use of unleaded fuel.

The NAAQS for particulate matter are based on two different particle-diameter sizes: PM_{10} and $PM_{2.5}$. PM_{10} are small particles that are likely to reach the lower regions of the respiratory tract by inhalation. $PM_{2.5}$ is considered to be in the range of respiration, meaning these particles can reach the alveolar region of the lungs and penetrate deeper than PM_{10}. There are many sources of particulate matter, both natural and anthropogenic, including dust from natural wind erosion of soil, construction activities, industrial activities, and combustion of fuels.

SO_2 is a colorless gas with a sharp, pungent odor. SO_2 is emitted in natural processes, such as volcanic activity, and by anthropogenic sources such as combustion of fuels containing sulfur and the manufacture of sulfuric acid.

The CAA also requires the EPA to assign a designation to each area of the U.S. regarding compliance with the NAAQS results of the ambient air quality monitoring data for that area. The EPA categorizes average air quality level over the level of compliance or noncompliance with each criteria pollutant as shown below.

- **Attainment**. Area currently meets the NAAQS.
- **Maintenance**. Area currently meets the NAAQS, but has previously been out of compliance.
- **Nonattainment**. Area currently does not meet the NAAQS.

Ozone nonattainment areas are further classified as extreme, severe, serious, moderate, or marginal depending on the severity of nonattainment.

3.6.1 Air Quality Baseline Condition

Ambient air quality in the study area is directly related to emissions from anthropogenic sources, including:

- stationary sources (e.g., stacks, vents, etc.)
- emissions from mobile sources (e.g., vehicles, ships, trains, etc.)
- chemical reactions in the atmosphere (e.g., the formation of ozone); and
- natural sources (e.g., trees, fires, and wind-blown dust).

Since all of these sources must be considered in an assessment of air quality, the EPA has identified air emissions inventories and ambient air monitoring as key methods for assessing air quality.

Existing Air Emissions Inventory

The existing air emissions inventory for Jackson County was summarized using data from EPA's emissions inventory database. Table 3.6-1 is a summary of emissions for Jackson County for 2002, the most recent data available from the EPA's database (EPA 2012a). The emissions information for each pollutant is presented by category: area source, point source, highway, and off-highway emissions.

Table 3.6-1
Summary of 2002 Air Emissions Inventory
for Jackson County (tons per year)

Source Category	CO	NH_3	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC
Area	8,783	132	693	7,672	1,738	461	18,409
Point	3,558	136	16,889	1,930	1,384	34,322	8,494
Highway Vehicles	31,751	154	4,820	137	104	156	2,836
Off-Highway Vehicles	13,998	3	10,311	509	469	786	2,733
Total	58,090	425	32,712	10,248	3,694	35,726	32,472

Source: EPA (2012a).

Existing Air-monitoring Data

Ambient air concentrations of certain air contaminants in Jackson County are measured by air-monitoring stations; the results are reported to the EPA. Current monitoring data for Jackson County are available for NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3 (EPA 2012a). Based on these monitoring data, Jackson County is currently designated as in attainment or unclassifiable with the NAAQS for all regulated pollutants.

Recent Revision to 8-hour Ozone Standard (2011)

As of September 22, 2011, the NAAQS for ozone is 0.075 ppm. Further, the EPA stated it would be moving forward with the initial nonattainment area designations under the 2008 ozone NAAQS. Based on a preliminary review by the EPA of ozone air quality data from 2008–2010, the EPA developed an initial listing of areas exceeding the 2008 ozone standard. This preliminary listing includes the Gulfport-Biloxi-Pascagoula combined statistical area with a potential classification of "marginal" under the 0.075 ppm ozone standard. A final determination of nonattainment area designations is expected by mid-2012. Based on the EPA's memo, the review of the ozone standard will continue, and the EPA will propose revisions to the NAAQS in 2013 that will be finalized by rulemaking in 2014 (EPA 2011a).

3.6.2 State Implementation Plan

Under the CAA, states are required to develop a State Implementation Plan (SIP) to define the strategies for assessing and maintaining the NAAQS. With the implementation of the new 8-hour ozone standard and designation of nonattainment areas in Mississippi, MDEQ will have the responsibility for revising its SIP, depending on the final area designations, to include areas that are in nonattainment with the ozone NAAQS. The SIP will describe how the area will reach attainment of the proposed 8-hour ozone standard. It is anticipated that the SIP will set emissions budgets for point sources such as power facilities and manufacturers; area sources such as dry cleaners and paint shops; off-road mobile sources such as boats and lawn mowers; and on-road sources such as cars, trucks, and motorcycles.

3.6.3 Conformity of Federal Actions

As required by the CAA, the EPA has promulgated rules to ensure that Federal actions conform to the appropriate SIP. Two rules were promulgated: (1) the Transportation Conformity Rule (40 C.F.R. Part 93); and (2) the General Conformity Rule (40 C.F.R. 51, Subpart W). The Transportation Conformity Rule applies to Federal Highway Administration (FHWA)/Federal Transit Authority (FTA) projects within maintenance or nonattainment areas. The General Conformity Rule applies to Federal actions, except FHWA and Transit Authority actions, within maintenance or nonattainment areas.

The CAA prohibits Federal agencies from funding, permitting, constructing, or licensing any project that does not conform to an applicable SIP. The purpose of this General Conformity requirement is for Federal agencies to consult with State and local air quality districts to help assure these regulatory entities know about the expected impacts of the Federal action and can include expected emissions in their SIP emissions budget.

The proposed project is located in Jackson County and if the county is designated a nonattainment area under the new 8-hour ozone standard, it is anticipated that a General Conformity Determination will be required by the EPA and the MDEQ so as to ensure expected emissions from the project are included in the new SIP emissions budget.

3.7 NOISE

Noise can affect the human and wildlife environment. The negative effects of noise on humans have resulted in efforts to control noise at a Federal, state, and local level through regulations, statutes and ordinances. Research concerning the effects of noise on wildlife is ongoing to establish specific standards and criteria addressing potential noise impacts in the natural environment.

3.7.1 Noise Metrics

Noise is measured in decibels (dB). When evaluating community impacts, measured noise levels are filtered to approximate the response characteristics of the typical human ear. The filtering is referred to as the A-weighted network and, accordingly, noise levels reported in community noise studies are expressed as dBA.

A number of descriptors have been developed to evaluate the effects of noise on the human environment. The two most common descriptors are the equivalent noise level (L_{eq}) and day-night sound level (DNL).

- L_{eq} is an average noise level over a specified time period, usually an hour [L_{eq}(h)]. The L_{eq}(h) is primarily used by the FHWA for evaluating noise generated by traffic on highways. The FTA also uses an L_{eq}(h) when evaluating noise sensitive sites primarily used during the daytime (e.g., schools, outdoor recreational facilities, etc.).
- DNL is also an average with a designated time period of 24 consecutive hours. Because humans are more reactive to noise at night, an additional 10 dBA is added to noise levels occurring between 10:00 PM and 7:00 AM when determining a DNL. This metric is used by the Federal Aviation Authority (FAA), Department of Housing and Urban Development (HUD), the Federal Railroad Authority (FRA) and FTA when evaluating noise, particularly in residential areas.

Using these descriptors, Federal agencies have developed criteria to determine whether noise attributable to a project or noise source would affect residential areas. These criteria are only applied to projects requiring an action by the particular Federal agency.

- FAA Criteria (Electronic Code of Federal Regulations 2012a) – DNL of 65 dBA or greater caused by airport/aircraft activities;
- FHWA Criteria (Electronic Code of Federal Regulations 2012b) – Hourly Leq of 67 dBA or greater caused by motor vehicles;
- HUD Criteria (Electronic Code of Federal Regulations, 2012c) – DNL of 65 dBA or greater in a HUD-financed community;
- FTA/FRA Criteria (FTA 2006) – Existing noise level plus 10 dBA or more caused by trains or transit sources.

It is well documented that short and impulsive sounds such as those produced from pile driving strikes, seismic air guns, and military sonar can cause behavioral reactions by fishes and cetaceans (whales, dolphins and porpoises; see Oslo/Paris Convention [OSPAR] 2009 for example) up to distances of several tens of kilometers from the sound sources. Certain sounds can also mask biologically important signals such as communication calls between baleen whales or fish. If the level that the animals receive is high enough, sound can affect hearing either temporarily or permanently and extremes can lead to injury or even death. The latter, however, usually occurs only in the case where animals are very close to very high intensity sounds, without having the opportunity to move away.

Even when sound alone is not severe enough to affect the well-being of populations of concern, together with factors such as fishery by-catch, pollution, and other stressors, sounds may create conditions that contribute to reduced productivity and effects on survival. It is therefore important to assess the effects of sound together with other stressors when undertaking assessments of impacts on ecosystems. The ecological significance of responses varies among species.

3.7.2 Local Ordinances

Communities commonly try to control anthropogenic noise through local ordinances. The City of Pascagoula has a general noise ordinance directed at particular noise sources such as automobile horns, radios and loudspeaker, steam whistles, engine exhaust discharge, compressed air devices, construction and demolition activities, and loading and unloading vehicles (City of Pascagoula 2010). The noise ordinance states “The making of any unreasonably loud noise in the city is hereby prohibited.”

The noise ordinance does not establish a specific decibel level that, when exceeded, is considered a violation. The ordinance does specify a timeframe that limits when excessive noise occurring during construction activities can occur (6:30 AM to 7:00 PM, Monday through Saturday).

3.7.3 Existing Conditions

The northern limit of the proposed project is near shore with industrial land uses located along the adjacent shoreline. Existing anthropogenic noise in the near shore project area is primarily generated by industrial activities (e.g., shipping, industrial operations and handling of cargo). Industrial facilities include the Signal International LLC East Yard, VT Halter Marine, Midstream Fuel Services, Chevron Pascagoula Refinery, MPC, Gulf LNG Energy, and various shipping terminals. Offshore, the study area is surrounded by open water with Petit Bois Island located about 2,500 feet south of the southern limit of the proposed project. Existing anthropogenic noise offshore is generated by shipping activities and maintenance dredging of the existing shipping channels.

The land uses commonly evaluated by Federal agencies that have established noise impact criteria include residential, institutional (e.g., schools and churches) and recreational. The residential area closest to the proposed project is located along Southshore Avenue with the nearest residence located about 1 mile northeast of the northern limit of the proposed project. The two nearest churches (Church of Jesus Christ of Latter-day Saints and Sacred Heart Catholic Church) are located about 1.5 miles northeast of the northern limit of the proposed project. The four nearest schools (Resurrection Catholic School, Sacred Heart School, Bethel Christian Academy and East Lawn Elementary School) are located about 1.5 to 2 miles northeast of the northern limit of the proposed project. The noise sensitive site closest to the proposed project is the outdoor recreational area at the Singing River Yacht Club located about 0.9 mile northeast of the northern limit of the proposed project. Compared to the northern limit of the proposed project, all of the noise sensitive sites are in closer proximity to existing industrial land uses.

Noise studies at other ports have documented noise levels generated by port activities ranging between 55 and 70 dBA (Port of Los Angeles 2008), depending on the location relative to the port/industrial activities. The effect of port/industrial activities on the noise level at a particular noise-sensitive site is highly variable, depending on ambient noise sources at the site, distance between the site and port/industrial noise sources, and characteristics of the noise propagation path between the port/industrial sources and the noise sensitive site. Typical noise levels for common outdoor activities or areas are provided in Table 3.7-1, including noise levels common to an urban/suburban residential area. As shown, noise in a typical urban/suburban setting may be around 50 dBA in the daytime and decrease to about 40 dBA during nighttime.

Table 3.7-1
Typical Noise Levels

COMMON OUTDOOR ACTIVITIES	NOISE LEVEL dB(A)	COMMON INDOOR ACTIVITIES
	---110---	Rock Band
Jet Fly-over at 1,000 feet		
	---100---	
Gas Lawn Mower at 3 feet		
	---90---	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 1 m (3 feet)
	---80---	Garbage Disposal at 1 m (3 feet)
Noise Urban Area (Daytime)		
Gas Lawn Mower at 100 feet	**---70---**	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	**---60---**	
		Large Business Office
Quiet Urban Daytime	**---50---**	Dishwasher Next Room
Quiet Urban Nighttime	**---40---**	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime		Library
	---30---	Bedroom at Night, Concert Hall (Background)
Quiet Rural Nighttime		
	---20---	
Lowest Threshold of Human Hearing	**---10---**	
		Lowest Threshold of Human Hearing
	---0---	

Source: California Dept. of Transportation Technical Noise Supplement, Oct. 1998, page 18.

In addition to the effects on the human environment, noise can also affect wildlife behavior (e.g., foraging, nesting). Offshore, existing ship operations generate low frequency underwater noise. The noise is a result of ship engine operations and propellers. Low frequency noise travels farther underwater; consequently, existing ship noise may affect marine wildlife beyond the immediate vicinity of the Bayou Casotte and Lower Pascagoula Sound shipping channels. Dredging operations produce underwater noise levels of 160 dB to 180 dB at a distance of about 3.3 feet from the noise source at frequencies ranging from 10 Hz to 1,000 Hz (NRC 2003) with peak intensity at frequencies between 50 and 500 Hz (Hildebrand 2003). Underwater noise from existing maintenance dredging activities may also affect marine wildlife within the vicinity of the shipping channels.

The Mississippi Sound barrier islands are part of the GUIS. The barrier islands provide feeding, resting and wintering habitat for resident and migratory bird species. The GUIS includes Petit Bois Island which is located approximately 2,500 feet south of the southern project limit. Mechanical dredging operations produce a noise level between 58 and 70 dB at a distance of 50 feet from the operating dredge (EPA 2003). Seabirds and shorebirds, and to a lesser extent land-based wildlife, may be affected by noise from existing maintenance dredging activities.

3.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

The purpose of the Hazardous, Toxic, and Radioactive Waste (HTRW) assessment is to identify indicators of potential hazardous materials or waste issues in the study area. The study area for this resource is referred to as the study area corridor to reflect the environmental database search area. The HTRW study area corridor is the project alignment centerline with a 1-mile radius and is shown on Figure 3.8-1.

3.8.1 Data Review

A review and evaluation of available data relevant to hazardous materials in the study area corridor was completed for this EIS to identify the existence of, and potential for, HTRW contamination that could impact or be impacted by the proposed project. The evaluation includes Bayou Casotte and Pascagoula Lower Sound channels from the Bayou Casotte Harbor to Petit Bois Island and Horn Island Pass (Figure 3.8-1 and Appendix C). The assessment consisted of a review of recent and historic aerial photographs and a review of regulatory agency data. Environmental Data Resources, Inc. (EDR) was retained to obtain aerial photography and regulatory agency database information. Site verification of the status and location of sites referenced in the regulatory database search or location of any additional unreported hazardous materials sites was not conducted.

According to EDR, aerial photography is not available for portions of the study area located offshore (Gulf), including Petit Bois Island. The photographs depict the northern part of the study area corridor as it appeared in 1940, 1952, 1955, 1972, 1975, 1980, 1985, 1992, 1994, 2005, and 2007. The study area corridor appears to have been undeveloped until 1972 when a variety of land uses are visible including industrial, recreational, vacant, and undeveloped range-pasture. In general, the developed land immediately adjacent to the Bayou Casotte Harbor is primarily industrial (petro-chemical, maritime shipping, etc.). Remaining properties located adjacent to the harbor include residential, recreational, commercial and light industrial.

A review (October 2011) of oil-gas wells and pipelines was conducted for the following assessment. Tables summarizing results from each database search are included in the EDR Report that is included as Appendix C. Maps showing approximate locations of HTRW sites, oil-gas wells and/or pipelines in the study area corridor are included in the EDR Report.

Sixteen HTRW records were available for the landward portion of the study area corridor. Some of these records are associated with the same facility and/or property that contains multiple database items such as Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environ-mental Response, Compensation, and Liability Information System (CERCLIS). Based on the results

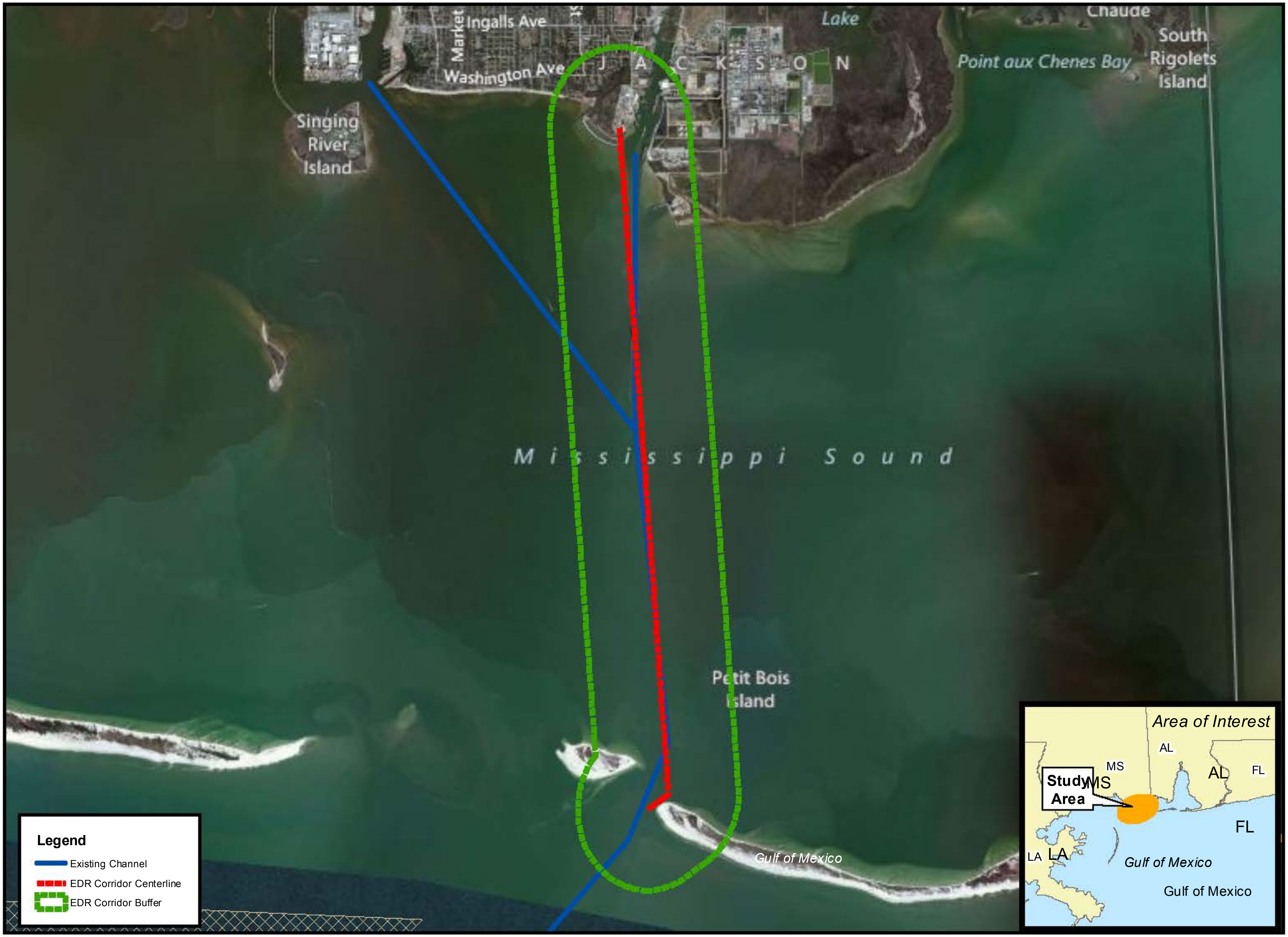


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Figure 3.8-1

HTRW Corridor Study Area

Bayou Casotte Harbor Improvement Project

N

0 2 4 Miles

of the regulatory agency database searches (EDR 2011), the following sites are located within the northern study area corridor:

- One CERCLIS no further remedial action planned (NFRAP) site
- One Corrective Actions (CORRACTS) site
- One RCRA large quantity generator (LQG) site
- One RCRA treatment, storage, and disposal site (TSDF)
- One toxic chemical release inventory system (TRIS) site
- One facility index system (FINDS) site
- Five state hazardous waste sites (SHWS)
- One state engineering controls site
- Two state institutional controls sites
- One state voluntary cleanup program (VCP) site
- One state hazardous waste manifest (HAZNET) site

The results of the file review are summarized below.

CERCLIS/NFRAP Sites. The regulatory file review listed one CERCLIS/NFRAP site identified by the EPA as having the potential for releasing hazardous substances or pollutants into the environment. According to the database search the site, Chevron Products Company, located at 250 Industrial Road, is listed as having petrochemical contamination in the soils and/or groundwater. However, the database report indicates clean-up of the contaminated soil/groundwater and no further remedial action was planned for this site. Additionally, this site is not recorded on the Federal Superfund list, or on the National Priority Listing.

CORRACTS Sites. The regulatory file review listed one CORRACTS site (Chevron Products Company) where material is handled with RCRA Corrective Action Activity. This report shows which nationally defined corrective action core events have occurred for every handler that has had corrective action activity.

RCRA Generators. The regulatory review indicated one RCRA regulated facility that generates hazardous waste (Chevron Products Company). This facility is listed as large quantity generator (LQG) which generates at least 1,000 kg/month of non-acutely hazardous waste or 1 kg/month of acutely hazardous waste.

RCRA TSDF Sites. The regulatory review indicated one RCRA regulated facility (Chevron Products Company) that generates, transports, stores, treats, and/or disposes of hazardous waste. Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste.

TRIS Sites. The regulatory review listed one site, Chevron Products Company, as a TRIS site. TRIS facilities release toxic chemicals to the air, water, and land in reportable quantities under SARA Title III, Section 313. The source of the database is the EPA.

FINDS Sites. The regulatory review listed one site, Chevron Products Company, as a FINDS site. FINDS contains both facility information and "pointers" to other sources of information that contain more detail. The source of the database is the EPA/National Technical Information Service (NTIS).

State Hazardous Waste Sites. Five SHWSs were identified within the study area corridor. The sites are: Halter Marine Pascagoula at 5110 Washington Ave, Chicago Bridge & Iron (CBI), Port of Pascagoula-Greenwood Island, Port of Pascagoula, and GSPC-Corning Glass. Lead was listed as the pollutant of concern associated with both of the Port sites. Mercury was listed as the pollutant of concern associated with GSPC-Corning Glass. Halter Marine is listed as no further action required and has no information regarding contaminants. In addition, no specific information was given in the database report regarding the CBI site.

State Engineering Controls Sites. The regulatory review listed one site, Port of Pascagoula, as a state engineering controls site. Engineering controls encompass a variety of engineered remedies to contain and/or reduce contamination, and/or physical barriers intended to limit access to property. They include fences, signs, guards, landfill caps, provision of potable water, slurry walls, sheet pile, pumping and treating of groundwater, monitoring wells, and vapor extraction systems.

State Institutional Controls Sites. The regulatory review listed two sites, Port of Pascagoula and Port of Pascagoula-Greenwood Island, as state institutional controls sites. Institutional Controls are non-engineered instruments, such as administrative and/or legal controls intended to minimize the potential for human exposure to contamination by limiting land or resource use. When engineered controls exist, institutional controls must also exist in order to provide mechanisms to assure that the engineered controls remain intact and operational.

State VCP Sites. The regulatory review listed one site, GSPC-Corning Glass, as a VCP site. No further action was given in the database report regarding this site.

State HAZNET Sites. The regulatory review listed one site, Chevron Products Company, as a state HAZNET site. Data is extracted from copies of hazardous waste manifests received each year by the DTSC. The source is the Department of Toxic Substance Control (DTSC).

Oil and Gas Well Sites. A search of the Mississippi State Oil and Gas Board (MSOGB 2011) online website indicates no oil and/or gas wells are located within the study area corridor.

Pipelines. Two pipeline systems were identified in the project area. Records obtained from Anchor QEA, Chevron Pipeline Company, Fugro Chance, Inc., and the USACE indicate these pipeline systems are active (in service) and reportedly transport natural gas and/or crude oil. The pipeline system that crosses Bayou Casotte Channel (near station 92+00) reportedly transports crude oil. Additionally, the pipeline system (Chandeleur Pipeline Company) that crosses Pascagoula Lower Sound

Channel (near station 33+00) has two 12-inch-diameter lines and one 16-inch-diameter line. One of the 12-inch-diameter lines is reportedly used as a spare line. The remaining 16-inch-diameter and 12-inch-diameter pipelines are active lines that transport crude oil and/or natural gas. Figure 3.8-2 shows the locations of the pipeline crossings within the project area.

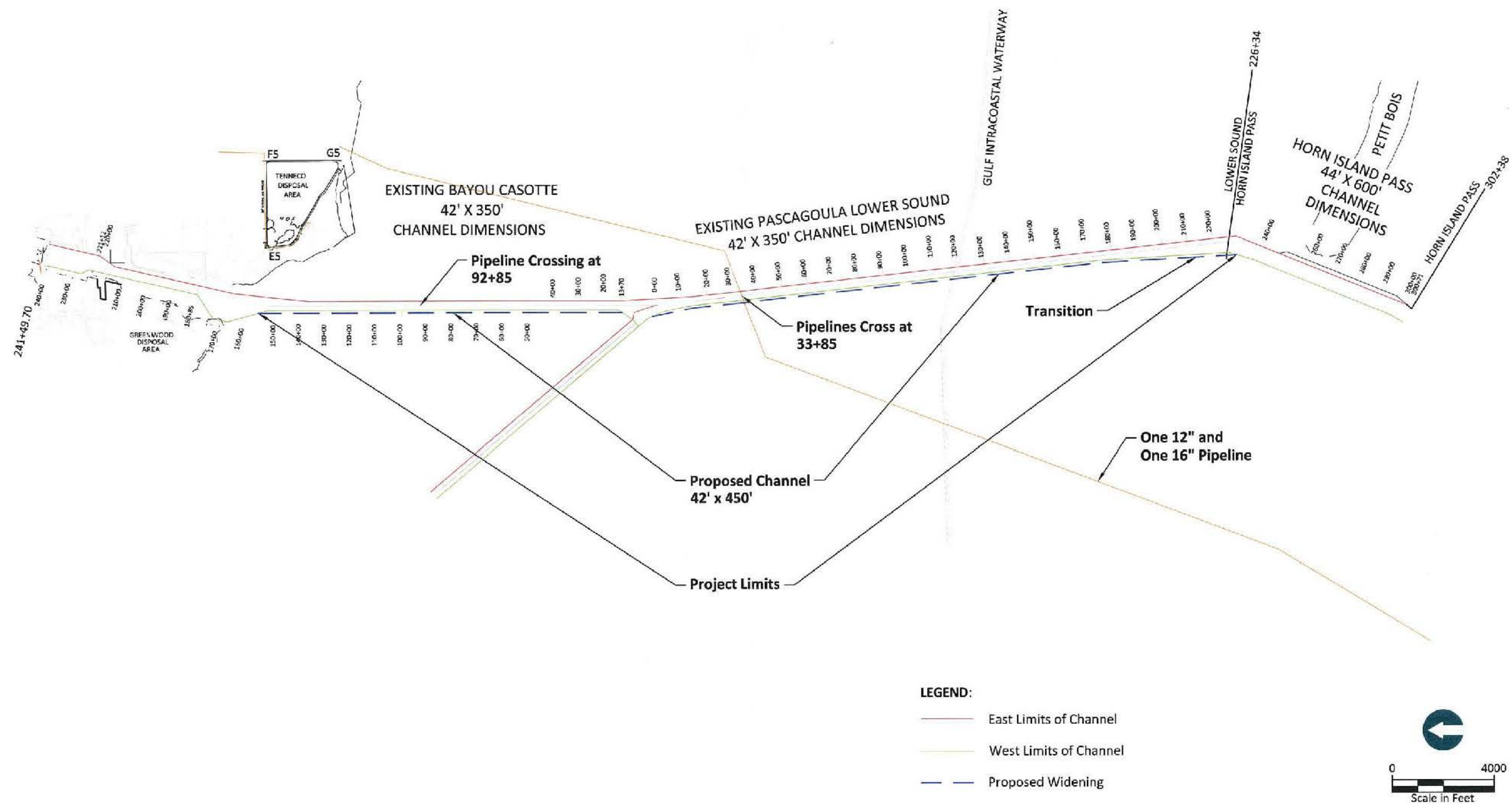
3.8.2 Emergency Response

The National Contingency Plan (NCP) is a regulation establishing an organizational structure and procedures for responding to oil spills in U.S. waters. The organizational structure and set of procedures is known as the National Response System (NRS). The National Oil and Hazardous Substances Pollution Contingency Plan, commonly called the NCP, describes how the Federal government responds to discharges of oil and the release of chemicals into the navigable waters or environment of the United States. The NCP, contained in Federal regulations at 40 C.F.R. 300, provides the organizational structure and procedures for preparing for and responding to oil spills (Occupational Safety and Health Administration [OSHA] 2011).

The NCP established the NRS, which provides for a coordinated response by all levels of government to a real or potential oil or hazardous substances incident. It functions through a network of government agencies and private sector organizations. This Federal coordination ensures that all stakeholders with jurisdiction over an incident have a place at the table and work together effectively. Under the NRS, the EPA is the lead agency for inland areas, and the USCG is the lead agency for coastal areas and major navigable waterways (OSHA 2011).

Key components of the NRS include the National Response Team (NRT), the Federal On-Scene Coordinator (FOSC), Regional Response Teams, and the responsible party, as described below. The NRT is made up of 16 Federal departments and agencies, including the Department of Labor (DOL) and OSHA. The NRT is responsible for coordinating nationwide interagency planning, policy, and response for oil and hazardous materials releases in support of the FOSC. The following is a list of NRT Members:

- U.S. Environmental Protection Agency (National Response Team Chair)
- U.S. Coast Guard (National Response Team Vice Chair)
- U.S. Department of Agriculture
- U.S. Department of Labor/OSHA
- U.S. Department of Commerce/National Oceanic and Atmospheric Administration
- U.S. Department of State
- U.S. Department of Defense
- U.S. Department of Homeland Security
- U.S. Department of Energy
- U.S. Federal Emergency Management Agency
- U.S. Department of Health and Human Services



US Army Corps of Engineers Mobile District	Figure 3.8-2	**Project Area Subsurface Pipelines (Source: Anchor QEA)**	Bayou Casotte Harbor Improvement Project

- U.S. General Services Administration
- U.S. Department of the Interior
- U.S. Nuclear Regulatory Commission
- U.S. Department of Justice
- U.S. Department of Transportation

Other Federal agencies with appropriate jurisdiction or expertise, along with private sector responders, may also support response efforts (OSHA 2011).

The FOSC is the lead Federal official with final decision-making authority in the spill response. The USCG provides an On-Scene Coordinator for oil spills in coastal waters, while EPA provides an On-Scene Coordinator for spills on land. Regional Response Teams consist of regional representatives of each agency in the National Response Team, state governments, and local governments. There are 13 Regional Response Teams, one for each of the 10 Federal regions plus one each for Alaska, the Caribbean, and Oceana. The Regional Response Team does not deploy as a team to incident sites. Instead, its members reach back to their organizations for needed resources, and individual members may deploy to the site as resources from their agencies. The Regional Response Team also oversees and reviews plans within a region (Region 4: Mississippi, Alabama, Florida, Georgia, Tennessee, North Carolina, South Carolina, and Kentucky) (OSHA 2011).

The responsible party is in charge of preparing for, responding to, and paying for cleanup and damages from its pollution incidents. The responsible party must follow procedures in its facility or vessel response plan, which provides for resources to respond to a "worst case" discharge (OSHA 2011).

Additionally, the EPA lists the Mississippi Emergency Management Agency (MEMA) for a state emergency response commission (EPA 2012b). MEMA maintains the Mississippi Comprehensive Emergency Management Plan (MEMA 2012). Within the plan, Mississippi Emergency Support Function #5 – Emergency Management Annex and Emergency Support Function #10 – Oil and Hazardous Materials addresses emergency response to oil spills. The purpose of Emergency Support Function #5 is to provide overall support activities of state government for all incident management, providing the core management and administrative functions to support the response to significant incidents effecting local and state operations. The purpose of Emergency Support Function #10 is to "to provide state support to local governments in response to an actual or potential unplanned discharge or release of hazardous materials following catastrophic disasters, industrial accidents, and radiological incidents not from a fixed nuclear facility, transportation incidents, or other major events." It details the plan to be used to respond to incidents where threatened or actual incident exceeds local response capabilities or when state capabilities are exceeded and Federal government response is requested. Contacts are as follows:

Mike Womack
Director, Mississippi Emergency Management Agency
Chair, Mississippi State Emergency Response Commission
P.O. Box 5644, Pearl, Mississippi 39288

Brian Maske
Hazmat/WIPP Program Manager, LEPC Coordinator
Mississippi Emergency Management Agency
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Fax: 601.933.6815

3.9 WATER QUALITY

The State of Mississippi has developed water quality criteria for intrastate, interstate and coastal waters by the Mississippi Commission on Environmental Quality. State-wide criteria exist for the following parameters: water temperature, pH, dissolved oxygen (DO), bacteria and toxic substances. In addition to the state-wide criteria, EPA criteria for ammonia, cyanide and sulfide toxicity were evaluated as well as literature derived thresholds for total suspended solids (TSS). Existing water quality conditions in the project area, specifically salinity, DO, TSS, nutrients, bacteria, and various metals and pesticides, are addressed here. The fate of these water quality pollutants is influenced strongly by currents, flows, and other physical and chemical factors, all of which were previously addressed in sections 3.3 and 3.4, Bathymetry and Hydrodynamics.

Water quality parameters were analyzed using the EPA's National Coastal Assessment (NCA) data that span the entire study area (EPA 2011c) and the USACE's spring 2010 sampling within the Bayou Casotte and Pascagoula Channels (USACE 2011e). There were 71 sampling stations found within the study area from the NCA data set. While several parameters were covered in the data, not all of them were used for this study. The parameters used for this study include: DO, pH, salinity, temperature, TSS, chlorophyll-*a*, and nutrients (nitrogen and phosphorous). The USACE 2010 sampling data included 17 stations that tested for temperature, DO, pH, salinity, and turbidity. All of these parameters were analyzed except for turbidity. Station locations are shown on figures 3.9-1 through 3.9-4. A summary table including the range and average values when available for the reviewed parameters as well as appropriate water quality criteria and compliance are provided in Table 3.9-1.

3.9.1 Water Temperature, Salinity, Dissolved Oxygen, and Total Suspended Solids

Water Temperature

Water temperature can affect several of the other water quality parameters. For example, warmer waters have a lower oxygen saturation level than colder waters; all other factors remaining the same, warm water often has lower levels of DO than colder water.

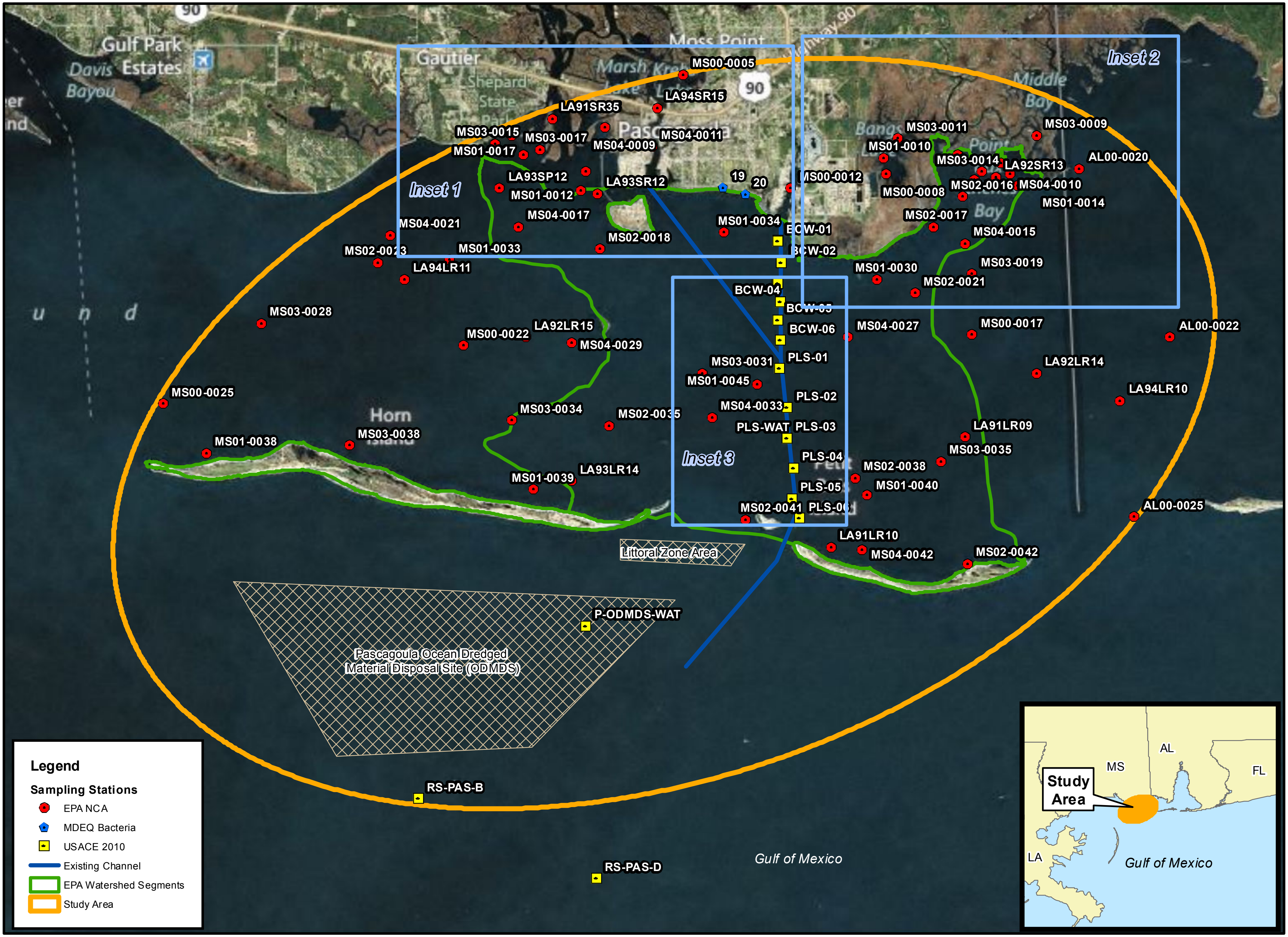

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Figure 3.9-1

Water Quality Sampling Stations

(Source: EPA National Coastal Assessment Database)

Bayou Casotte Harbor Improvement Project

0 4 8 Miles

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Figure 3.9-2

Water Quality Sampling Stations (Inset 1)

(Source: EPA National Coastal Assessment Database)

Bayou Casotte Harbor Improvement Project

0 1 2 Miles

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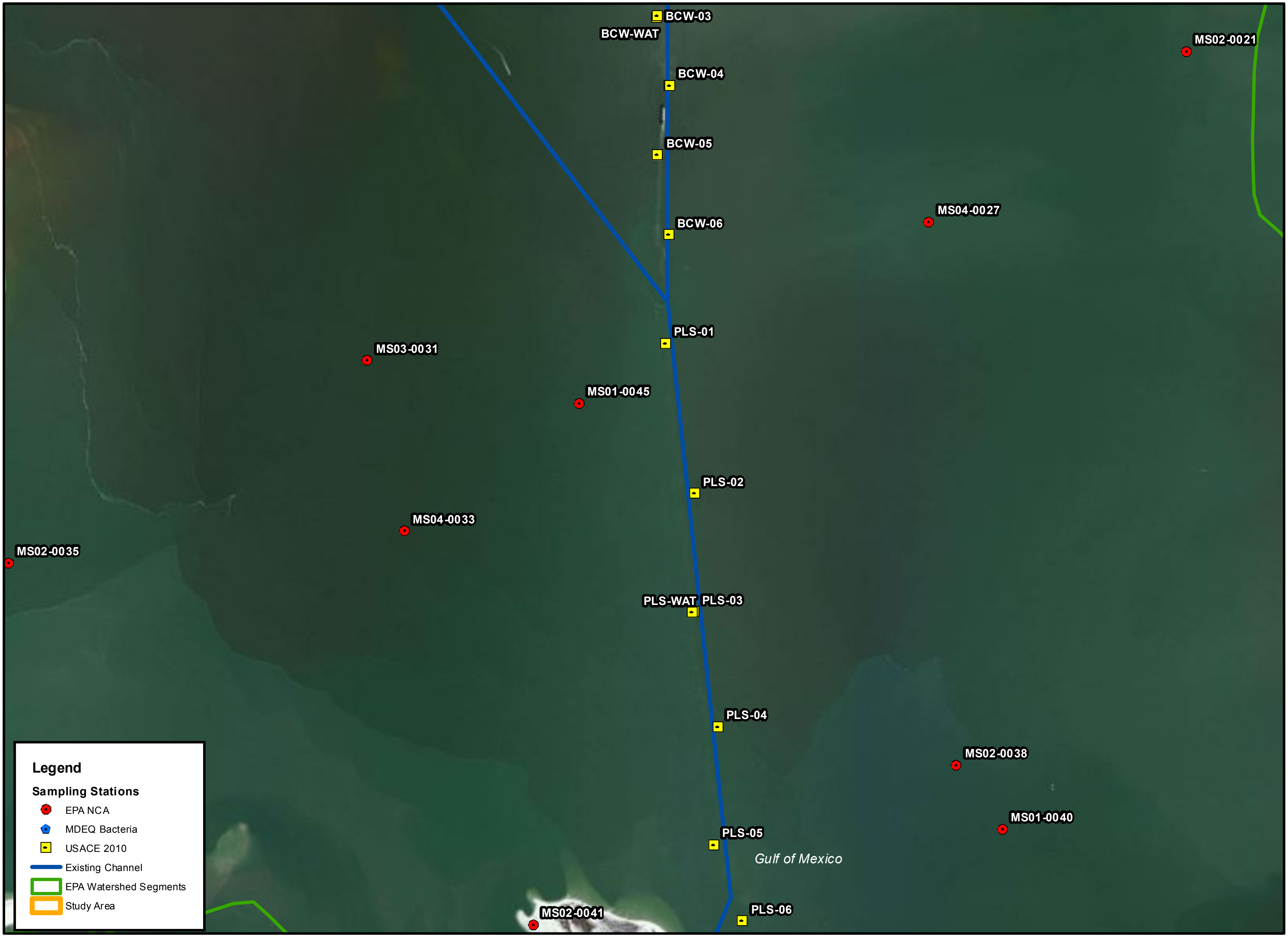
Figure 3.9-3

Water Quality Sampling Stations (Inset 2)

(Source: EPA National Coastal Assessment Database)

Bayou Casotte Harbor Improvement Project



US Army Corps of Engineers
Mobile District

Figure 3.9-4

Water Quality Sampling Stations (Inset 3)

(Source: EPA National Coastal Assessment Database)

Bayou Casotte Harbor Improvement Project

0 1 2 Miles

Table 3.9-1
Summary of Parameter Concentrations, Water Quality Criteria, and Compliance

Parameter	Unit	Minimum	Maximum	Average	Criteria	Compliant	Source
Water Sample							
Water Temperature	°F	63	90	82	90	Y	MDEQ
Salinity	ppt	3.9	33.9	25.3	No criteria		
Dissolved Oxygen (instantaneous)	mg/L	0.6	9.9	6.0	4.0	N (see text)	MDEQ
Total Suspended Solids	mg/L	0	88	24	80	Y	Stanley and Sellers 1986
Total Nitrogen	mg/L	0.02	0.83	0.56	No criteria		
Total Phosphorus	mg/L	0.02	0.19	0.06	No criteria		
Fecal coliform bacteria (do not exceed)***	cfu/100mL	2	6000	199	400	N	MDEQ
Fecal coliform bacteria (10% exceedance)***	cfu/100mL	2	6000	199	200	N	MDEQ
Enterococci bacteria (do not exceed May–Oct)***	cfu/100mL	2	4200	61	35	N	MDEQ
Enterococci bacteria (do not exceed Nov–April)***	cfu/100mL	2	2000	43	35	N	MDEQ
Ammonia (acute)*	mg/L	0.33	0.33	NA	5.83	Y	EPA
Ammonia (chronic)*	mg/L	0.33	0.33	NA	0.875	Y	EPA
Ammonia (acute)**	mg/L	0.3	0.3	NA	3.68	Y	EPA
Ammonia (chronic)**	mg/L	0.3	0.3	NA	0.553	Y	EPA
Un-ionized ammonia (acute)*	mg/L	NA	NA	NA	0.233	N	EPA
Un-ionized ammonia (chronic)*	mg/L	NA	NA	NA	0.035	N	EA
Standard Elutriate Samples							
Ammonia (acute)*	mg/L	9	25.2	NA	5.83	N	EPA
Ammonia (chronic)*	mg/L	9	25.2	NA	0.875	N	EPA
Ammonia (acute)**	mg/L	0.79	20.5	NA	3.68	N	EPA
Ammonia (chronic)**	mg/L	0.79	20.5	NA	0.553	N	EPA
Total Kjedahl Nitrogen	mg/L	11.3	41.9	NA	No criteria		
Total Organic Carbon	mg/L	1.2	5.1	NA	No criteria		
Total Phosphorus	mg/L	0.046	0.17	NA	No criteria		
Sulfide	mg/L	0.88	0.88	NA	0.0002	N	EPA
Cyanide (acute and chronic)*	µg/L	1.6	1.6	NA	1	N	EPA

Table 3.9-1, cont'd

Parameter	Unit	Minimum	Maximum	Average	Criteria	Compliant	Source
Cyanide (acute and chronic)*	µg/L	NA	NA	NA	1	N	EPA
Dissolved nickel (acute)*	µg/L	NA	NA	NA	74	N	EPA
Dissolved nickel (chronic)*	µg/L	NA	NA	NA	8.2	Y	EPA
Dissolved copper (acute)*	µg/L	NA	NA	NA	4.8	N	EPA
Dissolved copper (chronic)*	µg/L	NA	NA	NA	3.1	N	EPA
4,4'-DDT (acute)	µg/L	NA	NA	NA	0.13	Y	EPA
4,4'-DDT (chronic)	µg/L	NA	NA	NA	0.001	N	EPA
Endrin (acute)	µg/L	NA	NA	NA	0.037	Y	EPA
Endrin (chronic)	µg/L	NA	NA	NA	0.0023	N	EPA
Heptachlor (acute)	µg/L	NA	NA	NA	0.053	Y	EPA
Heptachlor (chronic)	µg/L	NA	NA	NA	0.0036	N	EPA
PCB*	ng/L	10.2	14.2	NA	30	Y	EPA
PCB**	ng/L	10.7	10.8	NA	31	Y	EPA

NA=not available

*= Bayou Casotte Channel

**=Pascagoula Lower Sound

***=recreational use

The EPA NCA dataset contains 252 temperature readings from all 71 stations. In addition, the USACE collected 64 samples from 17 stations in the Bayou Casotte and Pascagoula Navigation Channels, for a total of 316 additional samples within the study area. Sample depths ranged from 0 to 53 feet with an average depth of 8.45 feet. Temperatures ranged between 63 and 90 degrees Fahrenheit (°F) with an average temperature of 82 °F (see Table 3.9-1) (EPA 2011c, USACE 2011e). The MDEQ water temperature criteria indicate that the maximum value shall not exceed 90°F in coastal waters. Additionally, water temperature measurements are to be collected at 5 feet in waters 10 feet or greater in depth; and at mid-depth for those waters less than 10 feet in depth (MDEQ 2007). The water temperature was consistently below 90°F at all locations within the study area regardless of water depth, with the exception of two values collected at the surface water (stations MS04-0017 and MS01-0033 both at 1.64 feet). This exceedance, as low as it is, is biased high due to the data collection period being centered on the months of July to September, the warmest months of the year. According to the MDEQ water temperature criteria, the water temperature in the study area is in compliance with the state standards as the elevated water temperature readings were not collected at mid-depth.

Salinity

The EPA NCA dataset includes 252 salinity readings at 71 stations. This data set was supplemented with 64 salinity values from the USACE from 17 stations in the Bayou Casotte and Pascagoula Navigation Channels, for a total of 316 salinity samples within the study area. Depth of the samples ranged from 0 to 53 feet with an average depth of 8.5 feet of water depth for sampling sites. Salinity values ranged between 3.9 and 33.9 parts per thousand (ppt) with an average of 25.3 ppt (see Table 3.9-1) (EPA 2011c, USACE 2011e).

For all locations combined, there is evidence of two major phenomena with respect to salinity and depth (Figure 3.9-5). First, at water depths less than 5 feet, salinities range from less than 5 to greater than 30 ppt. Second, at water depths greater than 5 feet, salinities tend to stay above 20 ppt. These data suggest that the study area is characterized by a polyhaline water mass at depths greater than approximately 5 feet, while surface waters can vary (dependent upon rainfall) between oligohaline and polyhaline conditions. At times where surface waters are fresher, bottom waters will most likely still have higher salinities; these conditions can help to set up density stratification, which would likely result in lower levels of DO in bottom waters during such conditions. Water quality criteria for coastal water salinity do not exist (MDEQ 2007).

Dissolved Oxygen

DO is an important indicator of any water body's health. State standards for DO are that a daily average from a sample location should not fall below 5.0 milligrams per liter (mg/L), and that instantaneous readings should not fall below 4.0 mg/L (MDEQ 2007). Additionally, it is

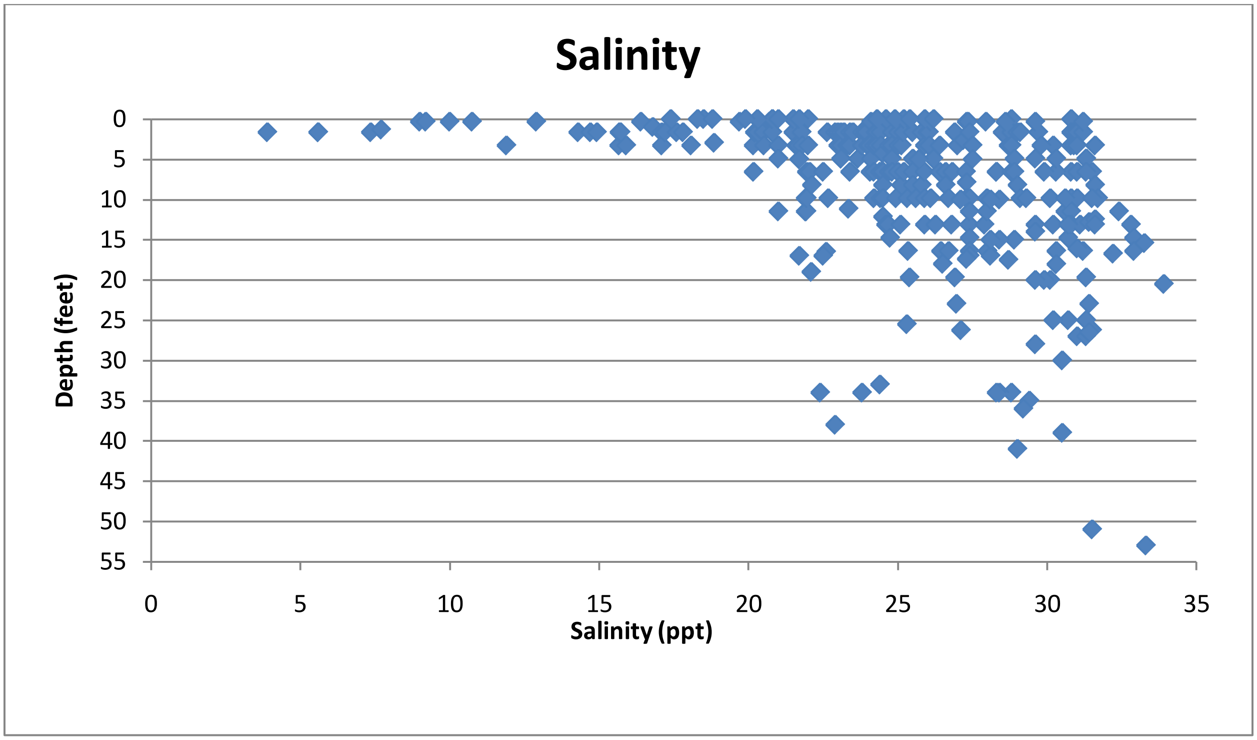


Figure 3.9-5. Salinity (ppt) vs. Water Depth (feet) in the Study Area

recommended (MDEQ 2007) that the measurement depth be determined based on where stratification layers (whether from temperature or salinity) exists. For those coastal waters which are stratified, DO measurements should be collected when possible from the mid-depth of the epilimnion if the epilimnion depth is 10 feet or less or at 5 feet from the water surface if the epilimnion depth is greater than 10 feet (MDEQ 2007). Based upon these guidelines, the MDEQ criteria do not require DO measurements from the bottom waters, in part because existing guidance (MDEQ 2007) is to measure DO levels in the water mass of stratified water bodies (the surface layer) where DO levels would be highest, while not sampling in the water mass (the bottom layer) where problematic levels of DO most commonly occur. Hypoxic conditions (DO levels below 2.0 mg/L) are most commonly encountered in bottom waters, which appear to be unregulated by the above-described water quality criteria. However, and based on previously documented concerns related to hypoxic conditions within the study area (which can be detrimental to sessile organisms), the DO data were analyzed from the study area without regard to water depth.

The EPA NCA dataset contained 252 DO readings at the 71 stations. These data were supplemented with 62 DO samples collected by the USACE at 15 stations in the Bayou Casotte and Pascagoula Navigation Channels, for a total of 314 DO samples within the study area. Sample depths for DO values ranged from 0 to 53 feet with an average depth of 8.5 feet. DO values range between 0.6 and 9.9 mg/L, with an average of 6.0 mg/L (see Table 3.9-1) (EPA 2011c, USACE 2011e).

All the samples collected in the study area were instantaneous, and therefore the daily average standard was not an appropriate metric to use for comparison to MDEQ water quality standards. Using the instantaneous reading standard, 39 of the 314 DO samples regardless of water depth fell below 4.0 mg/L indicating insufficient DO in 12 percent of the samples analyzed. Additionally, 23 of the 87 bottom water samples fell below 4.0 mg/L which included 5 of the bottom water samples with values below 2.0 mg/L indicating hypoxic conditions are present at times. The frequency of low DO readings may be higher due to the data set being restricted to warmer months of the year; warm water has a lower oxygen saturation level than colder water. However a more obvious influence on DO levels is water depth, as shown on Figure 3.9-6. The relationship between water depth and DO levels is statistically significant at $p < 0.01$, meaning there is a probability of less than one in a hundred that such a relationship is due to chance alone. The r-squared value of 0.2674 reflects a finding that approximately 26 percent of the variability in levels of dissolved oxygen can be explained by variability in water depths.

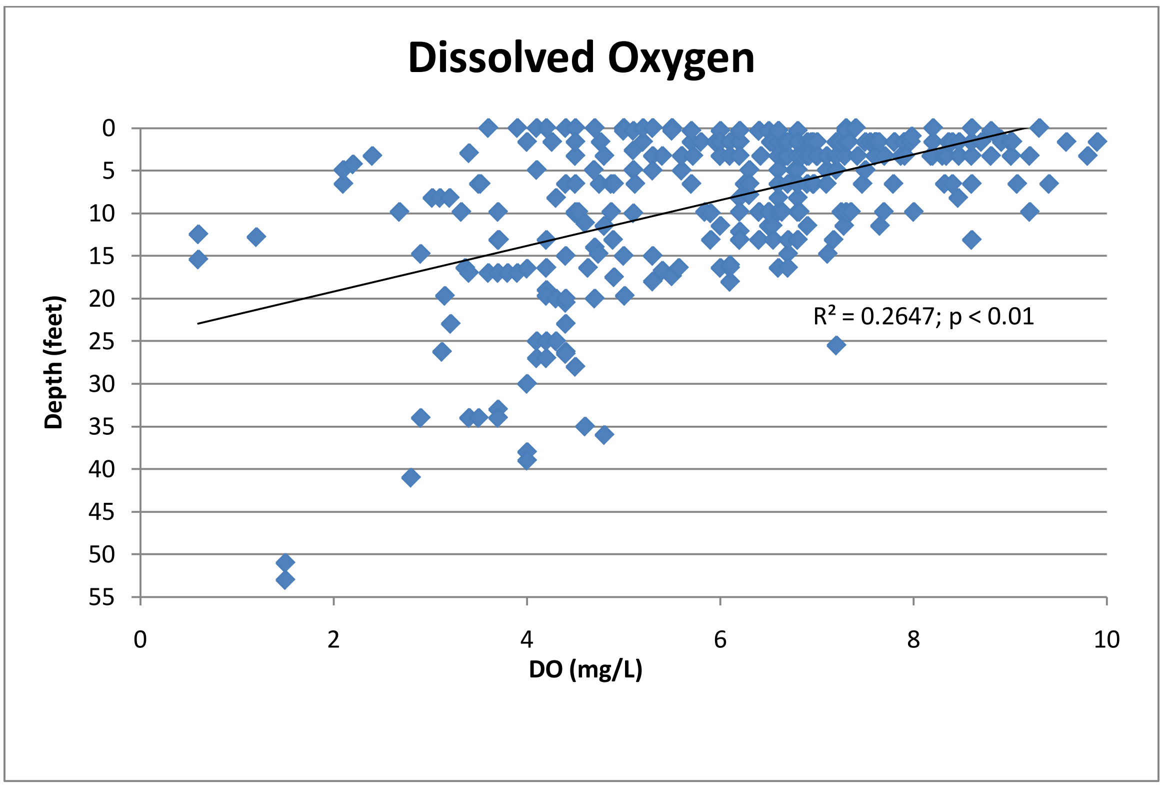


Figure 3.9-6. Dissolved Oxygen (mg/L) vs. Water Depth (feet) in the Study Area

Total Suspended Solids

Total Suspended Solids (TSS) refers to the material that is suspended in the water column. While TSS is sometimes used interchangeably with the term "turbidity" they are in fact different. TSS refers to the weight of material suspended in the water column, while turbidity is an optical property of water. TSS is a more useful parameter to assess in areas where oysters or other shellfish are found, because there are TSS guidance criteria available (i.e., Davis and Hidu 1969, Stanley and Sellers 1986). Turbidity criteria would be more appropriate in areas where water clarity targets and optical models exist for the protection of seagrass meadows. As there is no evidence of seagrass meadows in close proximity to the channel where turbidity measurements were taken (Moncreif 2007, NOAA 2011b, Figure 3.11-2) and as there is more data on TSS than turbidity, the following text focuses on TSS. Increased amounts of TSS can enter into a water body via a variety of human activities, including stormwater runoff from urban land uses, runoff from agricultural lands, runoff from transportation features (i.e., roads and parking lots) as well as increased stream bank erosion associated with high flows (which themselves can be brought about via increased impervious features). High levels of TSS over long periods of time can diminish the health and productivity of a water ecosystem (EPA 2006).

The EPA NCA dataset included 127 TSS values at 59 stations within the study area. There were no USACE samples collected in the study area that included TSS. Depth of the samples with TSS values ranged from 1.0 to 89 feet, with an average water depth at TSS value of 11.2 feet. TSS levels ranged between 0 mg/L and 88 mg/L with an average value of 24.3 mg/L (see Table 3.9-1) (EPA 2011c). While there is no quantitative MDEQ water quality standard for TSS (MDEQ 2007), prior studies have shown that the growth of oyster eggs and/or larvae is reduced at silt concentrations (silt being a component of overall TSS) above 180 mg/L (Davis and Hidu 1969). In Delaware Bay, oyster beds were not found in areas with TSS concentrations in excess of 80 mg/L (Stanley and Sellers 1986). Upon querying the data from EPA NCA, it was found that only one value out of 127 exceeded the 80 mg/L value identified by Stanley and Sellers (1986) while no values exceeded the higher threshold value identified by Davis and Hidu (1969). Overall, it would appear that levels of TSS in the Bayou Casotte Study area would not be expected to be problematic to filter feeders such as oysters.

3.9.2 Nutrients and Bacteria

Increases in nitrogen or phosphorus concentrations can lead to algal blooms, reduced water clarity, low levels of DO, and potential fish kills (Bricker et al. 2007). Although MDEQ has not established water quality standards for nitrogen, phosphorus, or chlorophyll-*a* (an indicator of algal and phytoplankton biomass), there is a water quality standard that states that "…dissolved oxygen shall be maintained at an appropriate level to avoid nuisance conditions" (MDEQ 2007). Consequently, levels of nitrogen and phosphorus in Mississippi Sound were assessed as to whether or not there was a potential link between nutrient levels and an adverse impact to DO via a potential link between nutrients and chlorophyll-*a*. The logic of such an approach is that if nutrient levels affect levels of phytoplankton, then there is the potential that the decay of algal blooms by oxygen-consuming microbes could bring about an indirect but important role in decreased DO levels (Turner et al. 2006). For this analysis total phosphorus (TP) and total nitrogen (TN) measurements were used to examine nutrient issues, because these parameters include both inorganic and organic components.

The EPA NCA dataset includes 51 samples from 22 of the stations within the project area for TP. Water depths for the TP samples ranged from 1.6 to 67.3 feet, with an average depth of 11.3 feet. TP concentrations ranged between 0.02 and 0.19 mg/L, with an average value of 0.06 mg/L (see Table 3.9-1) (EPA 2011c). For TN, the EPA NCA dataset included 25 samples from 12 of the stations within the project area. Water depths for the TN samples ranged from 2.6 to 67.3 feet, with an average depth of 18.0 feet. TN concentrations ranged between 0.02 and 0.83 mg/L, with an average value of 0.56 mg/L (see Table 3.9-1) (EPA 2011c).

Linear regression analysis was conducted to determine whether any relationships could be found between chlorophyll-*a* concentrations and the levels of TN and TP in the water column to address the DO interaction described above. Results of these analyses are presented in figures 3.9-7 and 3.9-8, respectively, and indicate that both TN and TP influence the algal biomass in the study area.

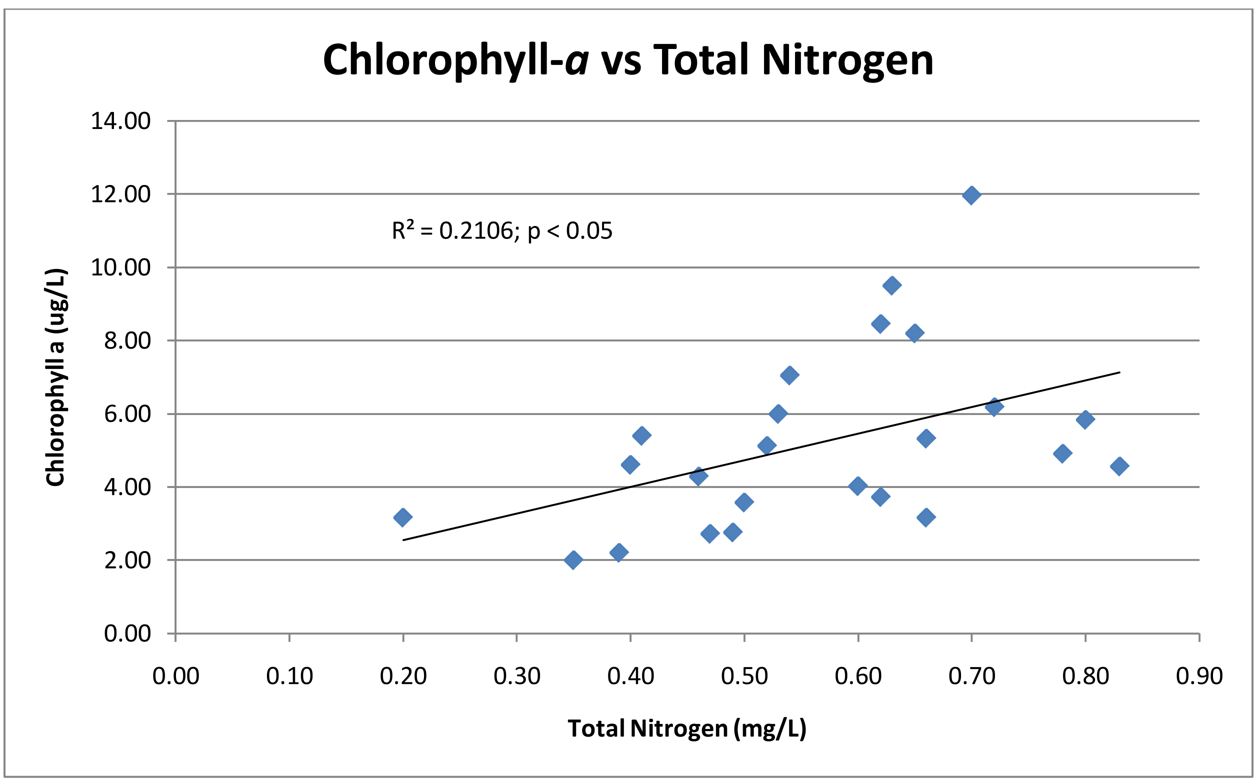


Figure 3.9-7. Chlorophyll-*a* (µg /L) vs. Total Nitrogen (mg/L) in the Study Area

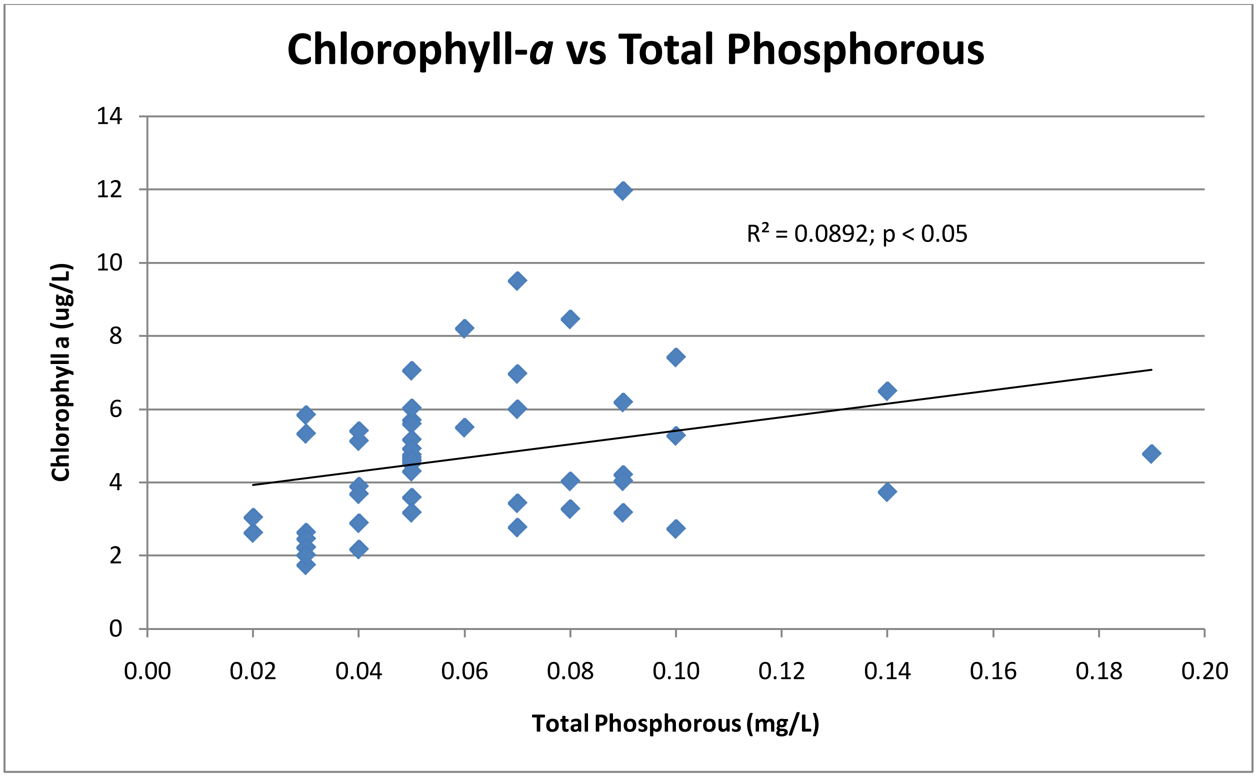


Figure 3.9-8. Chlorophyll-*a* (µg /L) vs. Total Phosphorus (mg/L) in the Study Area

The relationships between both TN vs. chlorophyll and TP vs. chlorophyll are both statistically significant at $p < 0.05$, meaning there is a probability of less than one in twenty that such a relationship is due to chance alone. The higher r-squared value for the TN vs. chlorophyll-*a* regression (compared to TP vs. chlorophyll-*a*) suggests that TN is the more important nutrient in terms of stimulating algal biomass. This finding is consistent with prior work in eastern Mississippi Sound (i.e., Bricker et al. 1999, 2007). In their assessment of the water quality of eastern Mississippi Sound, Bricker et al. (2007) concluded that water quality data from the region indicated “minimal” expression of any potential nutrient-related water quality problems, i.e., no link between DO and nutrients was found.

Total Maximum Daily Load (TMDL) for Bayou Casotte

EPA developed a TMDL for Bayou Casotte based on exceedances of the MDEQ criteria for un-ionized ammonia (EPA 2007b). In the TMDL report, EPA (2007b) lists chronic and acute criteria concentrations for un-ionized ammonia (NH_3) in salt water of 0.035 and 0.233 mg/L, respectively (see Table 3.9-1). In Bayou Casotte, 33 out of 50 samples exceeded the chronic criteria threshold for un-ionized ammonia, while 3 out of 50 samples exceeded the higher acute criteria threshold.

The TMDL for DO and un-ionized ammonia really applies to discharges from the MPC, National Pollutant Discharge Elimination System (NPDES) discharge. That facility had emergency discharges associated with Katrina, but also had discharges in non-hurricane years (photos from 2002, etc.).

The Bayou Casotte TMDL (EPA 2007b) indicates the northern-most portion of the Bayou, between EPA stations T-14 and T-22, is impaired. The southernmost extent of the impaired stretch of Bayou Casotte is Ingalls Avenue, north of the area to be impacted by the project, which is the subject of this report. Also, EPA (2007b) noted the un-ionized ammonia was recorded on low tides, but not high tides, indicating that the sources of impairment are upstream and mixing with tidal waters alleviates the impairment. The TMDL for un-ionized ammonia for Bayou Casotte appears to focus on a single source, the NPDES discharge (NPDES ID MS0003115) for process and stormwater discharges from MPC, located north of the areas being considered for channel widening.

USACE 2011 Site Water and Standard Elutriate Chemistry

From the USACE Spring 2010 sampling of the Bayou Casotte and Pascagoula Channels, two ambient water column and nine standard elutriate samples were available for analysis. Standard NOAA and/or EPA screening values for chemical constituents were used to determine exceedances (if any) of guidance criteria (see Table 3.9-1). A more-complete listing of results can be found in the USACE report for the Pascagoula Harbor Navigation Channel Final Supplemental EIS (USACE 2010). A brief summary of the results are provided below.

General Chemistry Parameters

In general, concentrations in the standard elutriate samples were higher than the concentrations in the overlying water column, as would be expected. For ammonia, concentrations in the two ambient samples were 0.33 mg/L and 0.30 mg/L for Bayou Casotte and the Pascagoula Lower Sound channels, respectively. It is important to note that there is a TMDL for ammonia for Bayou Casotte, discussed above. Each of the standard elutriates from the Bayou Casotte Channel exceeded the EPA ammonia calculated acute and chronic criteria (see Table 3.9-1).

In the standard elutriates, total Kjeldahl nitrogen (TKN) concentrations ranged from 11.3 to 41.9 mg/L, total organic carbon (TOC) concentrations ranged from 1.2 mg/L to 5.1 mg/L, and total phosphorus concentrations ranged from 0.046 mg/L to 0.17 mg/L (see Table 3.9-1). Water quality criteria are not available for TKN, TOC or TP. Sulfide was detected in one standard elutriate at a concentration of 0.88 mg/L which exceeds the EPA chronic criterion (0.002 mg/L). Nitrate and nitrite were not detected in the ambient water or standard elutriates from the channels (USACE 2011e), as would be expected for anoxic sediments at the bottom of a deep channel.

Cyanide was not detected in either of the ambient water samples, and there was only one detection of cyanide in the elutriate samples (1.6 µg/L) which also exceeded the EPA saltwater acute and chronic criteria for aquatic life.

Bacteria

The applicability of bacteria criteria to a particular water body depends upon its designated use. Criteria are established to protect water quality commensurate with the most stringent designated use assigned to each water body (MDEQ 2007). MDEQ collects samples from two stations located on the shoreline between Bayou Casotte and Lake Yazoo, and tests both locations for fecal coliform bacteria and *Enterococci* bacteria through their beach monitoring program.

Fecal coliform bacteria are a subset of total coliform bacteria and have been used as indicators of overall pathogen availability (although they are not necessarily pathogenic themselves). *Enterococci* bacteria have been suggested to be better indicators of the influence of humans and/or other mammals as the source of any bacterial contamination (EPA 2006).

Mississippi State Standards have been updated recently to reflect more stringent water quality requirements with respect to bacteria (MDEQ 2007). The water's within the study area are classified for recreational use and for fish and wildlife. The State Water Quality Standards, as described by MDEQ (2007), for each of these classifications are listed below. The recreational use water quality requirements are the most stringent therefore results will be reported in comparison to the recreational use criteria.

Recreation. Fecal coliform concentrations shall not exceed a geometric mean of 200 colonies per 100 milliliters (mL) based on a minimum of five samples taken over a 30-day period with no less than 12 hours between individual samples, nor shall the samples examined during a 30-day period exceed 400 per 100 mL more than 10 percent of the time. For both marine and estuarine coastal recreational waters, *Enterococci* shall not exceed a seasonal (May–October and November–April) geometric mean of 35 per 100 mL based on a minimum of 20 samples collected during each season. Coastal recreational waters do not include inland waters upstream of the mouth of a river or a stream having a natural connection to the open sea.

Coastal recreational waters are marine and estuarine waters that are suitable for recreational purposes, including such water contact activities as swimming, wading, and water skiing. Coastal Recreational Waters do not include inland waters upstream of the mouth of a river or a stream having a natural connection to the open sea. Water quality monitoring for bacteria content is conducted on these waters to protect the health of bathers. Water contact is discouraged on Mississippi's public access bathing beaches along the shoreline of Jackson, Harrison, and Hancock counties when *Enterococci* exceed 104 colonies per 100 mL and in all other coastal recreational waters when *Enterococci* exceed 501 colonies per 100 mL. When *Enterococci* counts exceed 104 colonies per 100 mL at the public access beaches, water contact advisories are issued by Mississippi's Beach Monitoring Task Force. For recreational use, both stations exceeded the fecal coliform bacteria criteria and *Enterococci* criteria.

Fish and Wildlife. From May through October, when water contact recreation activities may be expected to occur, fecal coliform shall not exceed a geometric mean of 200 per 100 mL based on a minimum of five samples taken over a 30-day period with no less than 12 hours between individual samples, nor shall the samples examined during a 30-day period exceed 400 per 100 mL more than 10 percent of the time. From November through April, when incidental recreational contact is not likely, fecal coliform shall not exceed a geometric mean of 2,000 per 100 mL based on a minimum of five samples taken over a 30-day period with no less than 12 hours between individual samples, nor shall the samples examined during a 30-day period exceed 4,000 per 100 mL more than 10 percent of the time.

Statistical analyses were performed on data obtained from the MDEQ (2011) beach monitoring data for both fecal coliform bacteria and *Enterococci* measurements taken at two stations within the study area. Results were then compared to MDEQ water quality standards. For recreational waters, both fecal coliform bacteria and *Enterococci* counts were analyzed. A total of 790 samples were taken for fecal coliform bacteria at both stations (combined) between January 2000 and August 2005. For *Enterococci* bacteria, 1,054 samples were taken at both stations (combined) from January 2004 to October 31, 2011. Fecal coliform and *Enterococci* concentrations exceeded standards for a recreational use designated water body (see Table 3.9-1) (MDEQ 2011).

3.9.3 Metals, Pesticides, and Other Contaminants

Metals. There were 17 metals tested in the analysis and of those, 12 were detected in the standard elutriates from the Pascagoula Harbor Navigation Channel. Beryllium, cadmium, mercury, silver, and tin were not detected. Only two of the detected metals, copper and nickel, exceeded EPA's saltwater water quality criteria in standard elutriate samples. Copper concentrations in the standard elutriates exceeded the EPA acute and chronic water quality criteria in three elutriate samples. Nickel concentrations in the standard elutriates exceeded the EPA's chronic water quality criteria in one elutriate sample. However, neither of the ambient water samples exceeded any of the EPA acute or chronic water quality criteria for the protection of aquatic life (USACE 2011e).

Polycyclic Aromatic Hydrocarbons (PAHs). None of the tested PAHs were detected in standard elutriates from the Bayou Casotte Channel, or Pascagoula Lower Sound Channel sites. One PAH, phenanthrene, was detected in the Pascagoula Lower Sound Channel, but had a concentration below the reporting limit and the same PAH was detected in the ambient water from the Pascagoula Lower Sound. Thirteen PAHs were detected in ambient water samples for the Bayou Casotte Channel. Individual PAHs in the standard elutriates were only detected in one case.

Polychlorinated Biphenyl (PCB) Congeners. Few PCBs were detected in the ambient water or standard elutriate samples, and when found, they were frequently below the laboratory reporting limit. Individual PCBs in the ambient water samples were detected in two cases and individual PCBs in the standard elutriates were detected in five cases. None of the PCBs were detected in the standard elutriates from the Pascagoula Lower Sound. The total PCB concentration in the standard elutriates ranged from 10.2 ng/L to 14.2 ng/L and PCB concentrations in the ambient water samples were 10.7 ng/L and 10.8 ng/L, in Bayou Casotte and Pascagoula Lower Sound, respectively. These concentrations were below the EPA chronic water quality criterion (30 ng/L).

Chlorinated Pesticides. DDT, endrin, and heptachlor are all organo-chlorine pesticides. DDT has been banned since the 1970s. Endrin is still available but its use is restricted. Heptachlor is also restricted, but can be used for fire ant control. All the pesticides detected in sediment samples are organo chlorines. Three chlorinated pesticides — alpha-BHC (benzene hexachloride), chloro-benside, and delta-BHC — were detected in the ambient water samples but none exceeded EPA acute or chronic water quality criteria.

A single exceedance of chronic water quality criterion was found for elutriate samples of 4,4'-DDT (Anchor QEA 2012) and the criterion threshold was exceeded by a factor of 6.7. Endrin concentrations in elutriate samples (i.e., pore water) exceeded chronic water quality criteria guidance by a factor of 3.4, while heptachlor in elutriate samples exceeded EPA chronic water quality criteria thresholds in two instances and by factors of 2.0 and 6.7 (Anchor QEA 2012).

Ten of the chlorinated pesticides — 4,4'-DDD, 4,4'-DDT, alpha-BHC, beta-BHC, dachtal, delta-BHC, endrin, gamma-BHC, heptachlor, and methoxychlor — were detected in the standard elutriates from the channels. Three of these chlorinated pesticides — 4,4'-DDT, endrin, and heptachlor — exceeded the EPA chronic criteria for the protection of aquatic life. The concentration of endrin at BCW-04 also exceeded the chronic criterion. Heptachlor was detected in elutriates at two sites from the study area, and exceeded the chronic water quality criterion threshold.

Dioxin and Furan Congeners. Of the 17 dioxin and furan congeners analyzed, each was detected in standard elutriates but frequently at concentrations below the laboratory reporting limit. The most toxic dioxin congener, 2,3,7,8-TCDD, was only detected in one of the standard elutriate samples from a single location in the channel.

3.10 SEDIMENT QUALITY

The EPA NCA data from surface grab samples at 71 stations from 1991 to 2004 in the study area (see figures 3.9-1 through 3.9-4) were analyzed to evaluate sediment quality. Sediment analysis included grain composition, organic contaminants, and inorganic contaminants.

In addition to the EPA data, the USACE (2010) also analyzed physical and chemical characteristics of six sediment samples from the Bayou Casotte Channel, three composite sediment samples from Pascagoula Lower Sound, and two reference sediment samples from USACE/EPA Region 4 designated reference sites south of Horn Island, Mississippi (RS-PAS-B and RS-PAS-D) (figures 3.9-1 through 3.9-4).

Furthermore, EA Engineering, Science, and Technology, Inc. (EA), conducted sediment characterization sampling in the project area in early April 2010 prior to the Deepwater Horizon oil rig explosion and spill (EA 2011a). Sediment characterization sampling was again conducted in late November to early December 2010 (EA 2011b). Comparison of the two data sets was conducted to determine whether sediment quality had been affected by the Deepwater Horizon oil spill. According to EA 2011b, "*Based on results of PAH and total petroleum hydrocarbon (TPH) testing of surface sediments collected in the Bayou Casotte and Pascagoula Lower Sound Channels, two USEPA-designated reference sites, and the Pascagoula ODMDS in November and December 2010, there were no discernable changes noted in the sediment quality that could be attributed to the Deepwater Horizon Oil Spill.*" Detailed results are presented in Appendix B, Dredged Material Management Plan.

3.10.1 Sediment Composition

EPA NCA Data

Sediment composition samples were taken at all 71 stations and the percent silt/clay (fine sediments), percent sand (medium to large sediments), and percent TOC was measured. The amount of silt/clay is important because fine sediments have more surface area than medium-large sediments which allows for more absorption sites for sediment contaminants. Clay particles in particular have more functional sites for toxins to bind to than compared to sand (Miller et al. 2005).

The percent of silt-clay for the 71 samples ranged from 0.6 to 99.7 percent, with an average of 36.5 percent. The percent of sand ranged from 0 to 93.7 percent, with an average of 10.4 percent. The percent TOC of the 71 samples ranged from 0 to 5.1 percent with an average of 0.7 percent (EPA 2011c).

The only sampling sites with substantial sand contents were from stations sampled at locations at least 2 miles offshore. Stations closest to Bayou Casotte (MS00-0012; inside the Port) and MS00-0034 (outside the Port) had silt/clay contents of 83.5 and 48.3 percent, respectively. Stations closest to the Pascagoula Channel (MS01-0045 and MS02-0041) had a silt/clay content of 15.9 and 0.6 percent, respectively. A general pattern appears where stations located in offshore waters close to the barrier island have lower silt /clay contents and higher sand contents, while stations located closer to the mainland typically are dominated by high silt /clay contents and much lower sand contents (EPA 2011c).

According to the EPA's 2008 National Coastal Conditions Report, TOC can be used to rank an area's sediment quality (EPA 2008b). Of the 71 samples taken in the study area, 66 (93 percent) were in "good" condition (TOC <2 percent), 4 (5.6 percent) were in "fair" condition (TOC between 2 percent and 5 percent), and 1 (1.4 percent) was in poor condition (TOC >5 percent) (EPA 2011c). Overall these results indicate the study area as a whole is "good" in terms of the amount of area with high levels of TOC. However, for those areas with sediments dominated by silt and clay, rather than sand, any contaminants loaded to the system would be able to persist over time via binding to the fine-grained sediments (Miller et al. 2005). To assess this concern, sediment quality data were compared to existing standards, developed from NOAA guidance criteria for toxins (Buchman 2008).

USACE Data

The sediments from the Bayou Casotte Channel and the Pascagoula Lower Sound (PLS-01 through PLS-04) were mainly silt and clay combinations. The Bayou Casotte samples ranged from 70.2 to 97.5 percent silt and clay, respectively. Samples from the Pascagoula Lower Sound Channel had silt and clay contents that ranged from 65.5 to 92.2 percent, and the Reference site (Site B) had a silt and clay content of 88.1 percent.

TOC concentrations ranged from 1 to 1.82 percent in the Bayou Casotte Channel sediments, and 0.08 to 0.90 percent in the Pascagoula Lower Sound locations. The TOC concentration at Reference Site B was 1.3 percent, and the TOC content was 0.339 percent at Reference Site D (USACE 2010).

3.10.2 Organic Contaminants

EPA NCA Data

Organic contaminants are the individual carbon-based contaminants that are part of the TOC measurement. EPA NCA data included a total of 141 different organic compounds measured from all 71 stations in the study area. These organic sediments were grouped as: pesticides, PCBs, PAHs, nonchlorinated pesticides, butyltin, and DDT. Most of these contaminants are anthropogenic and enter the water and sediment through runoff, sewage, and other sources (EPA 2011c). These contaminants were compared to criteria that provide screening concentrations for estuarine and marine sediments that is published by NOAA called the Screening Quick Reference Tables (SQuiRTs) (Buchman 2008). While NOAA has stated that SQuiRTs are intended for internal use only, the standards provide a good benchmark for understanding levels at which toxic concentrations should trigger concern or harm to aquatic and/or human life. SQuiRTs criteria can also help identify which toxins would need additional site specific testing.

Of the 141 organic contaminants that were measured, only 31 have screening criteria as established by NOAA. Of these 31 organic contaminants that were both measured and have established screening criteria, 17 of them exceeded one or more of their screening values and are discussed in further detail below.

The compounds of dieldrin, lindane, toxaphene are organo-chlorine insecticides that were mostly used for agricultural purposes. Dieldrin was phased out starting in the 1970s, and banned from agricultural use in the 1980s, as was toxaphene. Lindane has not been used in the U.S. since 2007.

DDT is also an organo-chlorine pesticide, but was banned from use in the U.S. in the 1970s. PCB refers to a class of organo-chlorine compounds that were used for industrial purposes, and were also banned in the 1970s. These compounds are known to be long-lived, and their presence in sediments, in some cases decades after their last probable use, is expected.

Butyltin. Thirty-three butyltin samples were taken at 11 of the NCA sampling stations within the project area. Mono-, di-, and tributyltin were taken at each station. Monobutyltin levels ranged between 0 ng/g and 1 ng/g with an average of 0.109 ng/g. Dibutyltin levels ranged between 0 ng/g and 3.67 ng/g with an average of 0.525 ng/g. Tributyltin levels ranged between 0 ng/g and 12 ng/g with an average of 1.356 ng/g.

DDT. DDT samples were taken at all 71 stations in the study area and DDT isomers and related compounds were evaluated (DDD, DDE, DDT, total DDT, OPDDD, OPDDE, OPDDT, PPDDD, PPDDE, and PPDDT). There are five NOAA SQuiRTs criteria thresholds related to DDT levels: Threshold Effects Levels (TEL), Effects Range-Low (ERL), Probable Effects Levels (PEL), Effects Range-Medium (ERM), and Apparent Effect Threshold (AET) for four of the ten categories of DDT listed above (total DDT, PPDDD, PPDDE, and PPDDT). For the five potential criteria, TEL limits were passed only by PPDDT (1.19 ng/g) and only in three out of the seventy samples, while ERL limits were passed by both PPDDT (1.0 ng/g) three out of the seventy samples and also by Total DDT (1.58 ng/g) one out of the 35 samples (EPA 2011c).

Non-Chlorinated Pesticides. Samples from only three NCA stations were tested for non-chlorinated pesticides (Diazinon, Disulfoton, Ethion, and Terbufos). All of the samples were zero or fell below the detection limit of 1.0 ng/g (EPA 2011c).

PAHs. PAH samples were taken at all 71 NCA stations within the study area. The samples were tested for presence of 47 types of PAH (Table 3.10-1). Of the 47 types of PAHs, 25 have NOAA SQuiRTs criteria. The PAHs covered by the NOAA SQuiRTs and the number of samples that exceed the criteria are listed in Table 3.10-1(EPA 2011c, Buchman 2008).

PCBs. PCB samples were taken at 70 of the 71 NCA stations in the study area. Samples were tested for 27 different PCBs (Table 3.10-2). There is only one NOAA SQuiRTs criteria, for total PCBs. Of the six threshold criteria that PCBs were compared against, only one value exceeded one of the available criteria, the TEL of 21.6 ng/g.

Pesticides. There were 22 pesticides that were sampled for in 70 of the 72 stations within the study area. The min, mean, max, and number of samples (count) for each pesticide samples are shown in Table 3.10-3. There are NOAA SQuiRTs criteria for six of the 22 pesticides that were sampled (aldrin, dieldrin, heptachlor epoxide, hexachlorobenzene, lindane, and toxaphene). Of these 6 pesticides that were both tested for and also have SQuiRTs criteria, only lindane and toxaphene exceeded available criteria (TEL values) twice out of 70 and 67 samples, respectively (EPA 2011c).

Table 3.10-1
PAH SQuiRTs

Analyte	Count	NOAA SQuiRTs (ng/g)							Number of Samples Above SQuiRTs Levels						
		T20	TEL	ERL	T50	PEL	ERM	AET	T20	TEL	ERL	T50	PEL	ERM	AET
Acenaphthene	70	19	6.71	16	116	88.9	500	130		1	1				
Acenaphthylene	70	14	5.87	44	140	128	640	71	1	3	1				
Anthracene	70	34	46.9	85.3	290	245	1,100	280	3	1	1	1	1		1
Benzo(a)anthracene	70	61	74.8	261	466	693	1,600	960	3	2	1	1	1		
Benzo(a)pyrene	70	69	88.8	430	520	763	1,600	1,100	2	1	1	1			
Benzo(b)fluoranthene	70	130			1,107			1,800	2			1			
Benzo(k)fluoranthene	70	70			537			1,800	1						
Benzo(g,h,i)perylene	70	67			497			670	1						
Biphenyl	67	17			73										
Chrysene	70	82	108	384	650	846	2,800	950	2	2	1	1	1		
Dibenz(a,h)anthracene	70	19	6.22	63.4	113	135	260	230	1	4	1				
2,6-dimethylnaphthalene	70	25			113										
Fluoranthene	71	119	113	600	1,034	1,494	5,100	1,300	3	3	1				
Fluorene	70	19	21.2	19	114	144	540	120							
Indeno(1,2,3-c,d)pyrene	70	68			488			600	1						
1-methylnaphthalene	70	21			94										
2-methylnaphthalene	70	21	20.2	70	128	201	670	64							
1-methylphenanthrene	70	18			112										
Naphthalene	70	30	34.6	160	217	391	2,100	230							
Total High Molecular Wt. PAHs	35		655	1,700		6,676	9,600	7,900		1					
Total Low Molecular Wt. PAHs	35		312	552		1,442	3,160	1,200							
Total PAHs	35		1,684	4,022		16,770	44,792								
Perylene	15	74			453										
Phenanthrene	36	68	86.7	240	455	544	1,500	660	1	1					
Pyrene	71	125	153	665	932	1,398	2,600	2,400	2	2	1				

Table 3.10-2
PCB Statistics

(ng/g)	Total PCB	PCB101	PCB105	PCB110	PCB118	PCB118a
minimum	0	0	0	0	0	0
mean	1.365	0.202	0.038	0.087	0.133	0.344
maximum	22.31*	3.87	1.37	0.76	1.70	3.61
count	35	70	70	43	59	11
	PCB126	PCB128	PCB138	PCB153	PCB170	PCB18
minimum	0	0	0	0	0	0
mean	0.030	0.032	0.312	0.303	0.077	0.030
maximum	0.72	1.19	4.32	3.40	1.60	1.40
count	70	70	70	70	64	70
	PCB180	PCB187	PCB187a	PCB195	PCB200	PCB206
minimum	0	0	0	0	0	0
mean	0.203	0.124	0.034	0.017	0.100	0.023
maximum	2.20	1.90	0.20	0.27	0.20	0.35
count	70	59	11	70	2	70
	PCB209	PCB28	PCB29	PCB44	PCB52	PCB66
minimum	0	0	0	0	0	0
mean	0.012	0.036	0.000	0.033	0.392	0.028
maximum	0.17	1.30	0.00	1.10	12.00	0.82
count	70	70	2	70	67	70
	PCB77	PCB8	PCB87			
minimum	0	0	0			
mean	0.011	0.132	1.145			
maximum	0.28	1.70	2.29			
count	59	70	2			

* Exceeds TEL of 21.6 ng/g

Table 3.10-3
Pesticide Statistics

(ng/g)	Aldrin*	alpha-BHC	alpha-Chlordane	alpha-Endosulfan	beta-BHC
minimum	0	0	0	0	0
mean	0.004	0.072	0.001	0.003	0.049
maximum	0.060	0.388	0.039	0.078	0.310
count	70	10	70	67	9
	beta-Endosulfan	Carbophenothion	cis-Nonachlor	delta-BHC	Dieldrin*
minimum	0	0	0	0	0
mean	0.011	0.000	0.003	0.010	0.024
maximum	0.540	0.000	0.020	0.060	1.100
count	70	2	10	9	61
	Endosulfan sulfate	Endrin	gamma-Chlordane	Heptachlor	Heptachlor epoxide*
minimum	0	0	0	0	0
mean	0.025	0.025	0.007	0.000	0.002
maximum	1.400	0.810	0.030	0.015	0.079
count	59	68	10	70	70
	Hexachlorobenzene*	Lindane (gamma-BHC)* ^	Mirex	Oxychlordane	Oxyfluorfen
minimum	0	0	0	0	0
mean	0.052	0.028	0.001	0.002	0.000
maximum	0.850	0.860	0.049	0.020	0.000
count	70	70	70	10	2
	Toxaphene* +	trans-Nonachlor			
minimum	0	0			
mean	0.021	0.004			
maximum	1.000	0.200			
count	67	70			

*NOAA SQuiRTs available
^ exceeded TEL Value (0.32 ng/g) twice
+ exceeded TEL Value (0.10 ng/g) twice

USACE Data

The USACE tested for PAHs, PCBs, dioxin and furan congeners, chlorinated pesticides, semivolatile organic compounds (SVOCs), and butyltin for organic contaminants.

PAHs. The USACE tested for 18 PAHs, of which 13 have TEL and PEL values available for review. Eight of the 18 individual PAHs were detected in the channel sediments and none were detected above their relevant TEL concentrations. One individual PAH was detected in the Reference Site B sample but none of the individual PAHs were detected in the Reference Site D sample. Total PAH concentrations in the channel sediments ranged from 9.08 µg/kg to 57.4 µg/kg and none exceeded TEL or PEL threshold concentrations. The total PAH concentration at Reference Site B was lower than the Bayou Casotte Channel locations, PLS-01/02, and PLS-03/04. The total PAH concentration at Reference Site D was higher than the total PAH concentration at PLS-05/06 (USACE 2011e).

PCBs. The USACE tested for 27 PCB congeners; these were compared to TEL and PEL values for total PCB concentrations. Nine of the 27 tested PCBs were detected in at least one sample. Total PCB concentrations did not exceed TEL or PEL values. The total PCB concentration at Reference Sites B and D also did not exceed the TEL or PEL values (USACE 2011e).

Chlorinated Pesticides. The USACE tested for 25 chlorinated pesticides and seven of them have TEL and PEL values available for comparison. Eleven of the 25 chlorinated pesticides were detected in the study area sediments, but none exceeded TEL or PEL values. At each reference site, nine chlorinated pesticides were detected at low concentrations and none of the concentrations exceeded the TEL (USACE 2011e).

Dioxin and Furan Congeners. Dioxin and furan congeners were detected in 84 of 153 cases (55 percent) in the sediments from the channels but there were no TEL or PEL exceedances.

Semivolatile Organic Compounds (SVOC) and Butyltin. The USACE tested for 46 SVOCs, five of which (bis[2-ethylhexyl]phthalate, butyl benzyl phthalate, diethyl phthalate, di-n-butyl phthalate, and phenol) were each detected at low concentrations in the sediment samples from the channels. There were no SVOCs detected at either of the reference sites. One of the 46 SVOCs [bis(2-ethyl-hexyl) phthalate] has a TEL and PEL value for comparison and one of the detected concentrations of bis(2-ethylhexyl) phthalate (at BCW-05) was above the TEL criteria (USACE 2011e).

There were four butyltins that were tested for in the sediments from the channels and from Reference Site B and Reference Site D and none were detected (USACE 2011e).

3.10.3 Inorganic Contaminants

Inorganic contaminants are those contaminants that are not carbon-based and generally mostly metals. Inorganic contaminants were analyzed using EPA NCA data and USACE data and the results of these analyses are presented below.

EPA NCA Data

There were 15 inorganic contaminants sampled at all 71 stations within the study area. All 15 of these metals had previously established NOAA SQuiRTs levels and all of them exceeded one or more criteria level. Table 3.10-4 shows how many times and which criteria were exceeded by each contaminant (EPA 2011c). The metal that exceeded relevant guidance criteria by the greatest

Table 3.10-4
Inorganic Contaminants

Analyte	Count	Min	Max	Mean	Median	St. Dev.	NOAA SQuiRTs (ng/g)							Number of Exceedances						
							T20	TEL	ERL	T50	PEL	ERM	AET	T20	TEL	ERL	T50	PEL	ERM	AET
Antimony	71	0.00	2.30	0.27	0.21	0.34	0.63			2.40			9.30	5						
Arsenic	71	0.00	21.00	4.28	2.20	4.86	7.40	7.24	8.20	20.00	41.60	70.00	35.00	14	14	14	1			
Cadmium	71	0.00	1.30	0.21	0.08	0.30	0.38	0.68	1.20	1.40	4.21	9.60	3.00	14	7	1				
Chromium	71	0.00	113.00	23.21	15.50	26.42	49.00	52.30	81.00	141.00	160.00	370.00	62.00	13	13	5				7
Copper	71	0.00	30.40	5.28	2.80	6.06	32.00	18.70	34.00	94.00	108.00	270.00	390.00		4					
Lead	71	0.00	37.10	9.31	7.30	8.74	30.00	30.24	46.70	94.00	112.00	218.00	400.00	2	2					
Manganese	71	4.70	930.00	211.04	125.00	230.72							260.00							18
Mercury	71	0.00	0.41	0.02	0.00	0.05	0.14	0.13	0.15	0.48	0.70	0.71	0.41	2	2	1				
Nickel	71	0.00	46.00	8.15	4.30	10.35	15.00	15.90	20.90	47.00	42.80	51.60	110.00	14	14	10		1		
Selenium	71	0.00	1.60	0.22	0.00	0.40							1.00							7
Silver	71	0.00	0.40	0.09	0.07	0.10	0.23	0.73	1.00	1.10	1.77	3.70	3.10	6						
Tin	71	0.00	6.40	2.20	2.40	1.86		0.05					>3.40		61					21
Zinc	71	0.00	143.00	32.79	18.70	35.86	94.00	124.00	150.00	245.00	271.00	410.00	410.00	8	2					

Source: U.S. EPA 2011c.

amount (percent above criteria) was tin (EPA 2011c). Cadmium, chromium, copper, nickel, and tin have been called “vessel-related” contaminants (Young et al. 1979) suggesting that their occurrence could be due to the presence of shipping in general, rather than a specific land-based source of contamination.

USACE Data

The USACE tested for 18 metals and 9 (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) have TEL and PEL values. Each of the tested metals was detected in most of the sediments with the exception of mercury in the sediment from both PLS-05/06 and from Reference Site D. Metals were not frequently detected at concentrations above the TEL criteria and none of the detected metal concentrations in the sediment exceeded PEL concentrations (USACE 2011e).

The USACE conducted an analysis of simultaneously extracted metals (SEM) and acid volatile sulfide (AVS) to evaluate the bioavailability of metals in the sediment of the five simultaneously extracted metals (cadmium, copper, lead, nickel, and zinc). An SEM/AVS ratio less than one indicates a high degree of probability that the metals are bound to organic material and not bioavailable to aquatic organisms. If the SEM/AVS is greater than one, then the metals in sediment exceed the sulfide binding ability and have a higher probability of being bioavailable to aquatic organisms. The SEM/AVS ratio was less than one for all sample and reference sites (USACE 2011e), suggesting that most metals would not be readily available for biological uptake upon disturbance.

3.11 FRESHWATER AQUATIC, WETLAND, AND TERRESTRIAL PLANT COMMUNITIES

This section describes the vegetation characteristic of the study area. Federally and state-listed threatened and endangered species are described in Section 3.14.

Ecoregions are typically defined as large geographic areas that are easily distinguished from adjacent regions by differing biotic and environmental factors or ecological processes. Fundamental differences between ecoregions often include changes in climate, physical geography, soils, and large-scale vegetation structure and composition. The study area is located in the East Gulf Coastal Plain ecoregion, as defined by The Nature Conservancy (TNC) and referenced by the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) (TNC 1999, Mississippi Museum of Natural Science [MMNS] 2005). The East Gulf Coastal Plain spans five states and over 42 million acres, extending from Georgia to Louisiana. It has a diverse assemblage of ecological systems, ranging from sandhills and rolling longleaf pine-dominated uplands to pine flatwoods and savannas, seepage bogs, and bottomland hardwood forests (MMNS 2005).

The unique characteristics of the region result from the interaction of three components—the subtropical climate, the oceanic regime, and the Mississippi River delta—all of which affect the physiography of the Gulf Coast (Gosselink 1984). The region is characterized by level topography and soils derived largely from unconsolidated sands, silts, and clays resulting from the erosion and outwash of the Appalachian Mountains (TNC 2001). The study area experiences a warm to hot, humid maritime climate. Although a high percentage of the study area occurs as wetlands, wildfire and soil geochemistry largely influence terrestrial ecosystems. Endemism is also reported to be moderately high. Additionally, coastal communities are frequently subjected to intense disturbance events from hurricanes or other storm systems.

Given the heterogeneity of habitat in the study area, it is likely that a variety of species occur within the study area with the exception of those species that are designated threatened or endangered (see Section 3.14). The MDWFP has identified 64 habitat subtypes across the state. Of these, 55 subtypes occur within the East Gulf Coastal Plain. The study area occurs at sea level, within the estuary and Mississippi Sound wildlife habitat type, and the Mississippi Sound (smooth bottom) subtype. Mississippi Sound is an estuarine/marine lagoon system that occurs inside, or associated with, the barrier island complex.

According to the MMNS (2005), most of the area immediately adjacent to the proposed project is considered urban and suburban land exhibiting impervious cover such as concrete or paving, or is heavily impacted by construction activities. Because of the urbanization and industrialization directly associated with the Bayou Casotte Channel, many “natural” habitats are not likely to be present. Only those species that are the most common, generalist species would be expected to be present.

3.11.1 Beaches and Shoreline Vegetation

Vegetation communities in the study area include natural and anthropogenic islands, barrier beaches and submersed aquatic vegetation (SAV). Shell middens, salt pannes, and barrier island uplands, are absent from the study area and are therefore not included in this discussion.

3.11.2 Mainland Anthropogenic, Mainland Natural, and Barrier Island Beaches

Anthropogenic beaches are artificially constructed for recreational use. These areas are typically less than 200 feet wide and are unvegetated.

Mainland natural beaches are narrow, linear, intertidal areas that extend along bayous, bays, and tidal rivers. These beaches form the interface between subtidal areas and intertidal marshes, and occasionally directly adjoin uplands (MMNS 2005). Natural beach substrates are muddy in texture due to heavy sediment deposition, although a few areas of sand or shell beach exist along the mainland and provide important nesting habitat for the Mississippi diamondback terrapin (*Malaclemys terrapin pileata*). Although natural beach communities provide habitat for aquatic wildlife species and microorganisms, these areas are typically unvegetated due to recurring tidal disturbance.

Barrier island beaches are frequently eroded by storm surge and wind, which limits the amount of vegetation cover. Vegetated swales and dune ridges occur slightly more inland from the shore, which parallel the coastline. These dune complexes, commonly referred to as the fore-island dune fields, frequently shift through erosive forces, contributing to an ever-changing landscape (Britton and Morton 1989). Behind the dune field, in areas referred to as back-beaches, semi-stable dunes commonly support a sparse vegetation community of grasses.

Common species found on beaches in the study area include Gulf bluestem (*Schizachyrium maritimum*), Le Conte's flatsedge (*Cyperus lecontei*), sea oats (*Chasmanthium latifolium*), panicgrass, dropseed (*Sporobolus* spp.), and umbrella-sedge (*Fuirena* spp.). Common herbs include square-flower (*Paronychia erecta*), poorjoe (*Diodia teres*), pineland scalypink (*Stipulicida setacea*), dixie sandmat (*Chamaesyce bombensis*), camphorweed (*Heterotheca subaxillaris*), coastal sand frostweed (*Helianthemum arenicola*), and beach morning glory (*Ipomoea imperati*).

3.11.3 Wetlands

Wetlands are typically transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water. Under the USACE regulation per 33 C.F.R. 328.3, wetlands are defined as: those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (USACE 1986).

Based on this definition, wetlands have three basic characteristics: hydrophytic vegetation, hydric soils, and wetland hydrology. The presence of all three of these criteria qualifies an area to be considered a jurisdictional wetland. The USFWS's National Wetland Inventory (NWI) classifies wetlands based on the types of plants, soils, and frequency of flooding, and are divided into five systems: marine; estuarine; riverine; lacustrine; and palustrine (Cowardin et al. 1979). Although not considered wetlands, both the NWI (USFWS 2011b) and Cowardin et al. (1979) include data on deep-water habitats (e.g., lakes, open bays and oceans, ponds, etc.).

The study area encompasses inland (terrestrial), estuarine, and marine areas (i.e., the Mississippi Sound). Marine or open-water portions of the study area are mapped as deep water marine and estuarine habitats (USFWS 2011b). Approximately 219,500 acres of estuarine and marine deepwater habitat occur within the study area (USFWS 2011b) (Figure 3.11-1). Mississippi Sound is considered a lagoon of marine origin whereas embayments are likely drowned river valleys (MMNS 2005). A chain of barrier islands, collectively included as part of the GUIS, serves as the outer boundary of Mississippi Sound. Inland, beyond tidal influences, freshwater or palustrine wetlands occur. Estuarine wetlands are tidally influenced and saltwater is diluted with freshwater. Tidal wetlands can be further classified as subtidal (where "substrate . . . is continuously submerged") or intertidal (where "substrate [is] exposed and flooded by tides") (Cowardin et al. 1979).

Palustrine and estuarine wetlands occur in the study area inland and at immediate coastal margins, respectively (Figure 3.11-1). Inland wetlands encompassed by the study area include three palustrine (or freshwater) wetland types: wetlands with emergent (or herbaceous) vegetation; scrub-shrub wetlands; and forested wetlands. Estuarine emergent and scrub-shrub tidal wetlands occur in the study area, and are associated with the Pascagoula River, Bayou Casotte, and other streams and bayous that enter Mississippi Sound. Barrier island wetlands include freshwater marshes, saltmarshes, salt meadows, estuarine shrublands, and slash pine woodlands located on flats, low depressions, swales, ponds, and intertidal zones (MMNS 2005). These wetlands most frequently occur along the seashore or between dune ridges.

The study area encompasses 331,771 acres, of which 219,500 acres (66.2%) are estuarine or marine deepwater habitat, 353 acres (0.1%) are freshwater ponds or lakes, and 13,628 acres (4.1%) are classified as wetlands (USFWS 2011b). The remaining acreage (98,290 acres; 29.6%) is predominantly urban and suburban land (Table 3.11-1).

Table 3.11-1
Wetland Distribution by Type in Study Area

Wetland Type	Acres	Percent Composition*
Estuarine and Marine Deepwater	219,500	66.2
Estuarine and Marine Wetland	11,551	3.5
Freshwater Emergent Wetland	381	0.1
Freshwater Forested/Shrub Wetland	1,696	0.5
Freshwater Pond	157	0.05
Lake	196	0.1

* Percent composition of total study area.

3.11.3.1 Freshwater Wetlands

Freshwater wetlands make up less than one percent of the project area and are landward of the project foot print.

Palustrine Emergent or Herbaceous Wetlands

Freshwater emergent or herbaceous wetlands, also described as freshwater marshes, are mapped by NWI as palustrine emergent (MDMR 1999). Common species found in palustrine emergent wetlands include: spikerushes (*Eleocharis* spp.), flatsedges (*Cyperus* spp.), rushes (*Juncus* spp.), smartweeds (*Polygonum* spp.), arrowheads (*Sagittaria* spp.), and cattails (*Typha* spp.). Approximately 381 acres of freshwater emergent wetlands occur within the study area (USFWS 2011b).

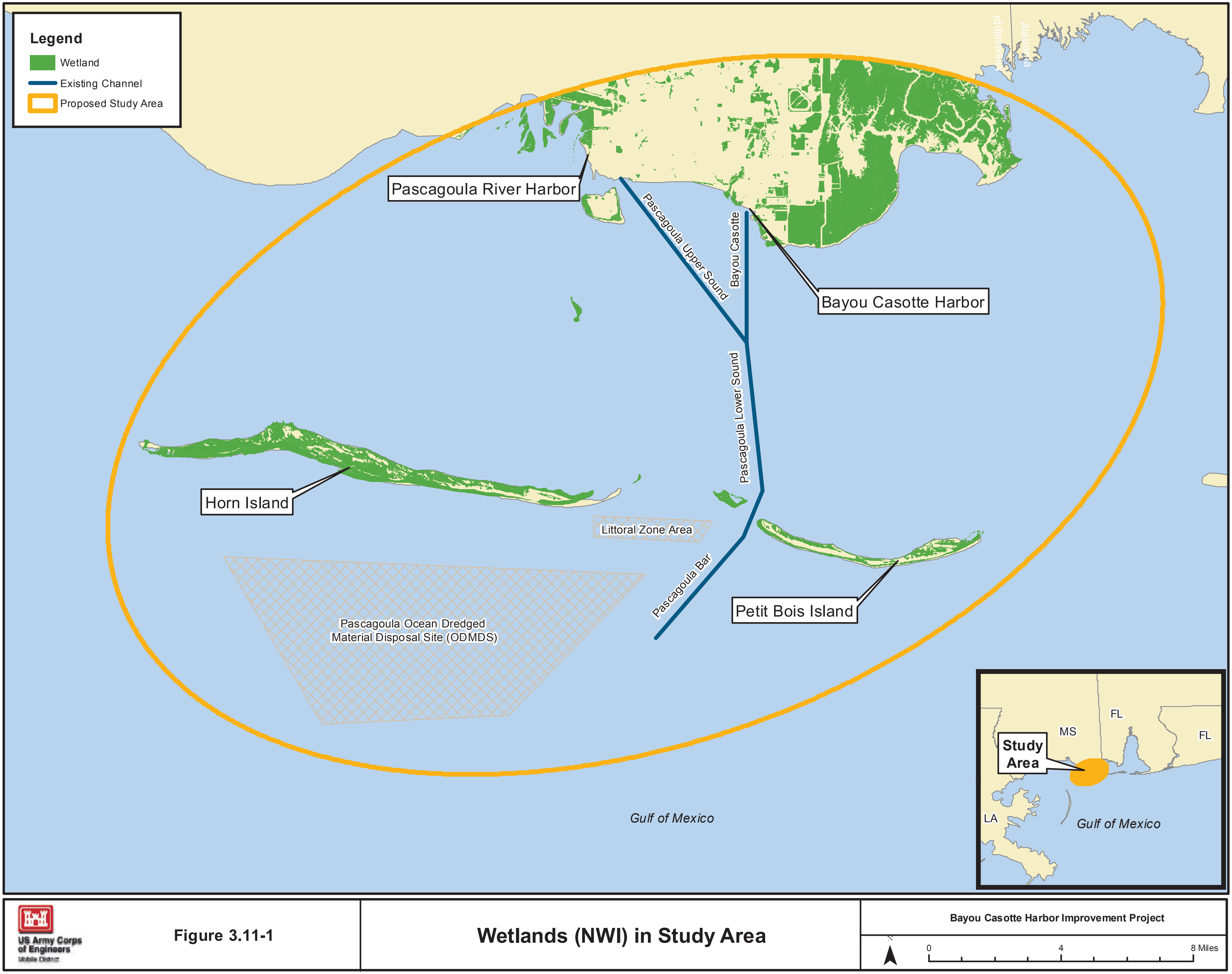


Figure 3.11-1

Wetlands (NWI) in Study Area

Palustrine Scrub-Shrub Wetlands

Palustrine scrub-shrub wetlands are generally associated with riverine systems or located in isolated depressions (e.g., swales). Palustrine scrub-shrub wetlands in the study area may include woody species such as buttonbush (*Cephalanthus occidentalis*), eastern groundsel (*Baccharis halimifolia*), southern wax myrtle (*Myrica cerifera*), and trees such as black willow (*Salix nigra*), green ash (*Fraxinus pennsylvanica*), water oak (*Quercus nigra*), willow oak (*Quercus phellos*), water tupelo (*Nyssa aquatica*), and the invasive Chinese tallow (*Sapium sebiferum*) (MDMR 1999). Approximately 1,696 acres of freshwater forested/shrub wetlands occur within the study area (USFWS 2011b).

3.11.3.2 Estuarine Wetlands

Estuarine Marsh Wetlands

Estuarine marshes consist of intertidal salt, brackish, and tidally influenced freshwater marshes, which create a fringe along the coast, barrier islands, and the mouths of streams and bays (Gosselink 1984). Tidal marshes typically exhibit organic muck substrates layered with mineral horizons that were likely deposited during storm surges. Most estuarine wetlands within the study area occur within estuaries of the Pascagoula River, Bayou Casotte, and other streams and bayous that enter the Mississippi Sound and are mapped as estuarine emergent and estuarine scrub-shrub (USFWS 2011b). Approximately 11,551 acres of estuarine and marine wetlands occur within the study area (USFWS 2011b).

Saltmarshes are characterized by their low geographic position within the tidal zone and their increased exposure to higher salinities. Saltmarsh vegetation varies depending on the elevation and proximity (zones) to open-water habitat. Lower zones located at sea level or slightly below are dominated by smooth cordgrass (*Spartina alterniflora*) communities along exposed shorelines and outer sections of tidal creeks and bays (Coastal Preserves Program [CPP] 1999). More inland marsh communities, located above the mean high water mark of the tidal zone, experience irregular flooding cycles and are typically dominated by marshhay cordgrass (*Spartina patens*) and black needlerush (*Juncus roemerianus*).

Brackish marshes experience moderate salinity and are less affected by storm surges, thereby allowing for the development of a greater diversity of plant species. Marshes at the lowest elevations are frequently inundated tidally. The dominant species in the low brackish marshes is smooth cordgrass. In areas of similar elevations but higher freshwater influx, black needlerush and wild rice (*Zizania aquatica*) are often dominant (MDMR 1999). At intermediate elevations, black needlerush occurs in saltier zones, whereas bulrush (*Scirpus* spp.) and saltgrass occurs in fresher zones.

Tidal freshwater marshes often exhibit the most diverse assemblage of plant species, yet these communities cover less land area within the region than saltwater and brackish marsh communities (MMNS 2005). Common species found in tidal freshwater marshes are similar to those in palustrine emergent wetlands and include: spikerushes (*Eleocharis* spp.), flatsedges (*Cyperus* spp.), rushes (*Juncus* spp.), smartweeds (*Polygonum* spp.), arrowheads (*Sagittaria* spp.), and cattails (*Typha* spp.).

Estuarine Scrub-Shrub Wetlands

Estuarine scrub-shrub wetlands occur at the highest elevations and are rarely tidally inundated. These communities occur as small linear patches parallel to the shoreline within a zone immediately above the salt marsh communities, or in other less tidally influenced zones. These communities often occur along bayou edges and adjoin upland communities, which may grade into maritime forests. Dominant plant species found in estuarine shrublands include eastern groundsel, southern bayberry (*Morella caroliniensis*), and bigleaf sumpweed (*Iva frutescens*) (MMNS 2005). Common plants include marshhay cordgrass, southern wax myrtle, bigleaf sumpweed (*Iva frutescens*), the exotic invasive tamarisk (*Tamarix* spp.), and bushy seaside tansy (*Borrichia frutescens*) (MDMR 1999).

3.11.3.3 Submersed Aquatic Vegetation

Submersed aquatic vegetation is a unique group of vascular plants that have adapted to underwater conditions. Typically, SAV refers to coastal seagrass beds and can range from marine seagrasses to freshwater angiosperms. Coastal seagrass beds are highly productive, perform a number of vital ecological functions in chemical cycling and physical modification of the water column and sediments, and provide food and shelter for commercially and ecologically important organisms (Orth et al. 2006).

In Mississippi Sound, SAV is declining. Forty years ago, an estimated 20,000 acres of SAV were documented in Mississippi Sound, and by 1998, only 2,000 acres were documented (Moncrieff 2007, Moncrieff et al. 1998). Declines in seagrass result from both natural and anthropogenic causes. Primary reasons for the disappearance of SAVs are most likely an overall decline in water quality, extended periods of depressed salinities, and physical disturbances, such as tropical storms and hurricanes. Physical loss of habitat and decreased light availability, coupled with declining water quality, are the most visible features that directly affect SAV (USACE 2009a).

Mississippi coastal waters contain three SAV community types: (1) barrier island seagrass, (2) widgeongrass (*Ruppia maritima*) beds, and (3) American wild celery (*Vallisneria americana*) beds (MMNS 2005). Barrier island seagrass communities historically hosted four species of seagrasses: shoalgrass (*Halodule wrightii*), turtlegrass (*Thalassia testudinum*), clovergrass (*Halophila engelmannia*), and manateegrass (*Syringodium filiforme*). However, the extent of these communities, as well as particular species, has declined considerably in recent decades (CPP 1999).

Widgeongrass beds occur in shallow and moderately turbid waters that are usually lower in salinity, such as bays, along bayous, on mudflats, and occasionally in barrier island ponds. American wild celery occurs in freshwater or oligohaline waters and is often found on muddy substrates in the upper reaches of estuarine bayous and streams flowing into coastal bays and the Mississippi Sound (MMNS 2005). Seagrass beds typically occur in less turbid, moderately saline habitats of the nearshore zone, north of the barrier islands. Currently, seagrasses are sparse in the region. According to NOAA (2011b), approximately 652 acres of SAV occurs within the study area, mostly on the north shorelines of the barrier islands (Figure 3.11-2). There are no documented continuous seagrass beds, only patchy distributed beds located in the study area (Table 3.11-2). No seagrasses appear to occur within the footprint of the proposed project (NOAA 2011b).

Table 3.11-2
Submerged Aquatic Vegetation Distribution

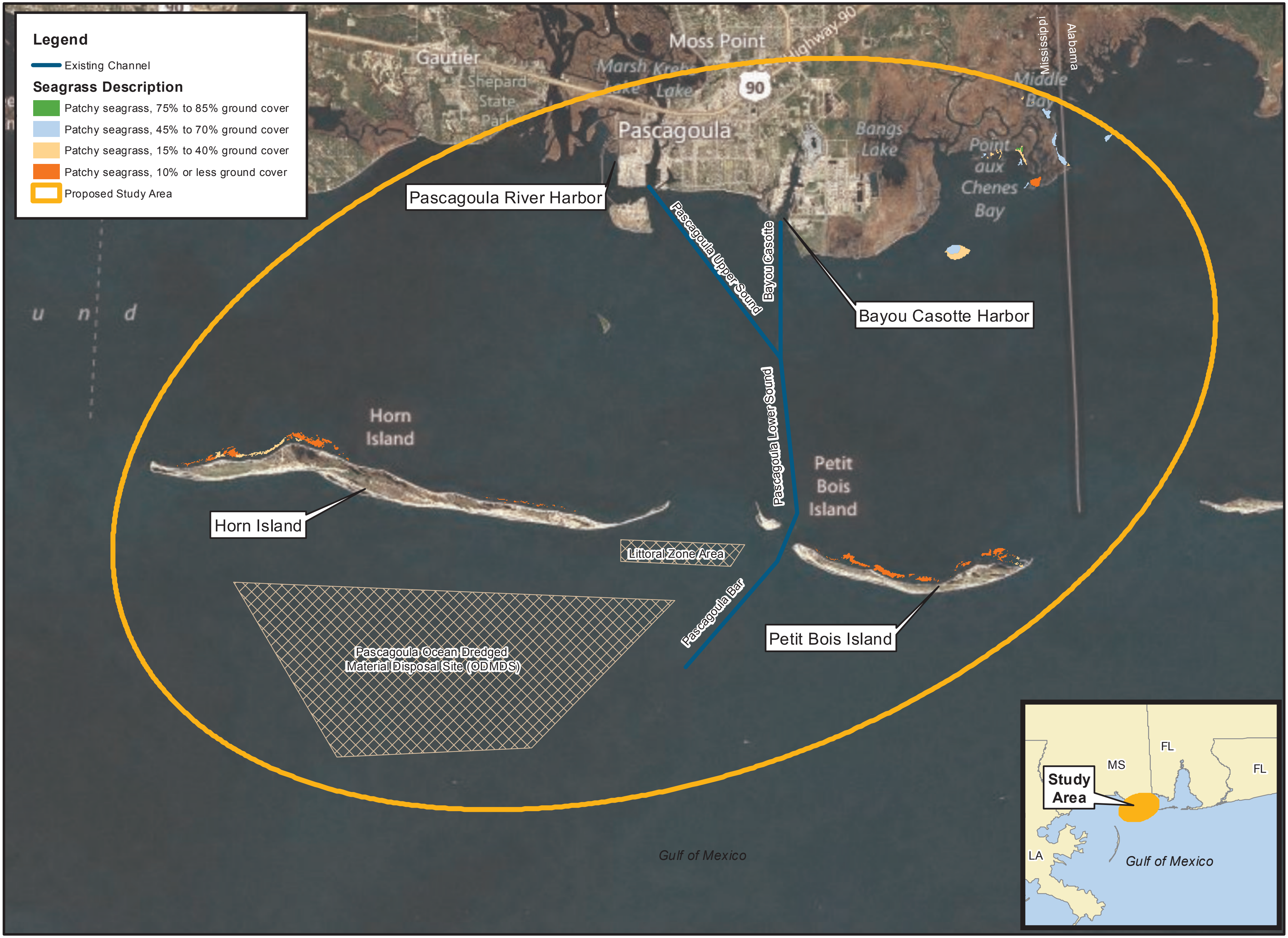
Description	Acres
Patchy seagrass, 75 to 85% cover	5.81
Patchy seagrass, 45 to 70% cover	115.56
Patchy seagrass, 15 to 40% cover	166.23
Patchy seagrass, 10% or less cover	364.45

Source: NOAA 2011b.

3.11.3.4 Non-Native and Invasive Aquatic Plant Species

A document from MDMR (Diaz and Clark 2005) states that aquatic invasive species "[are] a problem because there are many elements in place that make the state susceptible to aquatic invasions," including: abundant pathways, including commercial shipping, heavy recreational watercraft usage, aquaculture and the ornamental plant trade industry; a subtropical climate with abundant aquatic habitat that is naturally hospitable to nonindigenous aquatic species; increased coastal development, which can enhance the establishment of invasive species in areas where habitat has been altered. Those introductions have had unexpected ecosystem, economic, and social impacts. Aquatic invasive species harm native fish and wildlife in many ways. They can take over native species' habitat and disturb entire food webs. They also have major impacts on human activities by disrupting agriculture, shipping, water delivery, recreational and commercial fishing; undermining levees, docks, and environmental restoration activities; and impeding navigation and enjoyment of local and regional waterways.

According to the USGS web site listing nonindigenous aquatic species identified in Mississippi, there are 39 nonindigenous (non-native) aquatic plant species, all of which are freshwater species, with the exception of two brackish water species — Eurasian water-milfoil (*Myriophyllum spicatum*) and marsh fleabane (*Pluchea odorata*). In a Mississippi Press article dated November 16, 2011, there was a concern by MDMR that an introduction of freshwater invasive species may occur with the recent Mississippi River flooding. Giant salvinia (*Salvinia molesta*), an aquatic plant that can choke



US Army Corps of Engineers
Mobile District

Figure 3.11-2

SAV in Study Area

Bayou Casotte Harbor Improvement Project

0 4 8 Miles

out other vegetation, had been observed on the Pascagoula River. However, there is no evidence that the diversion of the Mississippi River floodwaters into the Mississippi Sound introduced invasive species (Pursley 2012).

3.12 MARINE AQUATIC COMMUNITIES

The marine aquatic communities in the study area include open water, open-bay bottom, offshore sands, and artificial reefs. There are no documented oyster reefs in the study area.

3.12.1 Open-Water

Mississippi Sound is a coastal plains lagoon estuary that receives freshwater from the Pearl and Pascagoula Rivers, as well as several small coastal rivers. A string of barrier islands (Cat, Ship, Horn, and Petit Bois) to the south act as a permeable barrier that helps hold freshwater flowing from the north and allows saltwater in through the passes that creates a mixing zone (Figure 1.7-1). Open-water areas in Mississippi Sound consist of a variety of unvegetated bottom habitats including clay/mud bottom, sand, and shell fragments with very little hard bottom substrate such as oyster reefs (MMNS 2005).

Open-water habitats support communities of planktonic organisms and corresponding fisheries populations. Phytoplankton (microscopic algae) are the major primary producers (plant life) in the open-bay, taking up carbon through photosynthesis and nutrients for growth. Phytoplankton are fed upon by zooplankton (such as small crustaceans, mollusks, and annelid worms), fish, and benthic consumers. In Mississippi Sound, phytoplankton species composition changes seasonally with the maximum abundance occurring in the winter and the minimum in the summer, which is dominated by diatoms (Molina and Regalje 2010). These communities are quite diverse, with occasional monotypic blooms. Distributions are influenced by salinity, nutrient concentrations, temperature, and wind conditions. Population composition, abundance, and diversity also vary by season (Holiday et al. 2007). Phytoplankton densities are greatest where riverine waters override and spread out over Mississippi Sound waters, creating a nutrient rich euphotic zone that is ideal for high rates of production (Ortner and Dagg 2011).

Blue-green algae and diatoms are the dominant microflora in marshes and SAV in Mississippi Sound. Red algae are the dominant filamentous algae in those systems and support coverings of epibenthic diatoms. Production is highest in seagrass beds in summer (August) and lowest in winter (January) (Moncreiff et al. 1992).

Zooplankton are important because they form the basis of the food chain and are the source of food for larval and juvenile fish including the federally threatened Gulf sturgeon (*Acipenser oxyrhynchus desotoi*). They are most abundant during the spring, with the minimum densities occurring in the fall. Zooplankton are limited by turbidity (which limits the phytoplankton production, and therefore food availability) and currents, which can carry them out to sea and away from concentrated food masses (Valiela 1995). The nutrient rich riverine waters entering Mississippi Sound influence zooplankton productivity in the Sound and in the barrier island passes where high abundance has been reported (Holiday et al. 2007).

Nekton assemblages (organisms that swim freely in the water column) consist mainly of secondary consumers feeding on zooplankton or juvenile and smaller nekton. Mississippi Sound supports a diverse nekton population including fish, shrimp, and crabs, with at least 152 species of fish (Rakocinski et al. 1996). Some of these species are resident species, spending their entire life in Mississippi Sound, whereas others are migrant species spending only a portion of their life cycle in the estuary.

Fish communities occurring in Mississippi Sound are inshore nekton, inshore demersal (bottom dwelling) resident, inshore demersal transient, offshore pelagic, and offshore demersal. The inshore demersal community is the most abundant (31 percent), followed by the inshore demersal resident community (25 percent), whereas, the offshore demersal and pelagic communities both make up approximately 19 and 16 percent of the species composition, respectively. Species composition changes with the seasons with a continual turnover of peak abundances of species (Rakocinski et al. 1996).

3.12.2 Open-Bay Bottom

Bay bottom benthic organisms are divided into two groups: epifauna, such as crabs and smaller crustaceans, which live on the surface of the bottom substrate, and infauna, such as mollusks and polychaetes, which burrow into the bottom substrate (Green et al. 1992). Mollusks and some other infaunal organisms are filter feeders that strain suspended particles from the water column; whereas, other organisms, such as polychaetes, feed by ingesting sediments and extracting nutrients. Many of the epifauna and infauna feed on plankton, and are then fed upon by numerous fish and birds (Armstrong et al. 1987, Lester and Gonzales 2001).

The Mississippi Sound bottom includes flat areas consisting of mud, fine to coarse sand, and shell fragments that contribute large quantities of nutrients and food, making them one of the most important components of this habitat type (Calnan et al. 1989). The distribution of the benthic macroinvertebrates is primarily influenced by bathymetry and sediment type (Calnan et al. 1989). Benthic macroinvertebrates found in the sediments of Mississippi Sound are primarily polychaetes, bivalves, gastropods, and crustaceans (Ross et al. 2009, Wilber et al. 2006).

The benthic macroinvertebrate community of Mississippi Sound near Pascagoula was assessed from 2000 to 2004 as part of the EPA’s NCA program (EPA 2011c). A total of 260 species (6,217 individuals) were collected from 28 sampling stations in the study area. The results from this study indicate that the benthic community in the study area is dominated by polychaete worms followed by gastropods and bivalves. Table 3.12-1 shows the representative species that occur in the study area in order of dominance.

Table 3.12-1
Representative Benthic Macro-invertebrates that Occur in the Study Area

Scientific Name	Common Name	Description	% of Total
Mediomastus ambiseta	No common name	Polychaete worm	19.0
Nemertea sp.	Ribbon worm	Polychaete worm	7.0
Paraonis fulgens	No common name	Polychaete worm	5.7
Paraprionospio pinnata	Pinnated spionid pinnata	Polychaete worm	3.6
Polygordius sp.	No common name	Polychaete worm	3.2
Unidentified bivalvia	--	Bivalve	2.9
Caecum pulchellum	Beautiful caecum	Gastropod	2.3
Caecum glabrum	No common name	Gastropod	2.0
Unidentified maldanidae	--	Polychaete worm	1.9
Phoronis spp.	Phoronids	Horseshoe worm	1.7
Owenia fusiformis	No common name	Polychaete worm	1.6
Lumbrineris verrilli	Clam worm	Polychaete worm	1.4
Brania wellfleetensis	No common name	Polychaete worm	1.3
Ampelisca sp.	Amphipod	Crustacean	1.2
Cossura delta	No common name	Polychaete worm	1.2
Tellina versicolor	Many-colored tellin	Bivalve	1.2
Unidentified tubificidae	--	Oligochaete worms	1.1
Unidentified ostracoda	--	Crustacean	1.1
Macoma mitchelli	Matagorda macoma	Bivalve	1.0
Unidentified echinoidea	--	Sea urchin	1.0
Nassarius acutus	Sharp nassa	Gastropod	1.0

Source: EPA 2011c.

3.12.3 Offshore Sands

Mississippi Sound consists of 25 percent nearshore habitat, less than 6.6 feet deep, and 75 percent offshore habitat (MMNS 2005). The medium to coarse sand in the Mississippi Sound is populated with macrobenthic organisms (Ross et al. 2009). Zooplankton consumes only 50 to 60 percent of the net phytoplankton (diatoms, dinoflagellates, and other algae) production, leaving a considerable portion available to the benthic fauna (Nybakken and Bertness 2005).

Bivalves found in offshore sands include the blood ark (*Anadara ovalis*), incongruous ark (*Anadara brasiliana*), southern quahog (*Mercenaria campechiensis*), giant cockle (*Dinocardium robustum*), disk dosini (*Dosinia discus*), pen shells (*Atrina serrata*), common egg cockle (*Laevicardium laevigatum*), crossbarred venus (*Chione cancellata*), tellins (*Tellina* spp.), and the tusk shell (*Dentalium texasianum*). One of the most common species occurring in the shallow offshore sands is the sand dollar (*Mellita quinquiesperforata*) as well as several species of brittle stars (*Hemipholis* *elongata*, *Ophiolepis elegans*, and *Ophiothrix angulata*). Many gastropods are common, including the moon snail (*Polinices duplicatus*), ear snail (*Sinum perspectivum*), Atlantic auger (*Terebra dislocata*), Salle's auger (*Terebra salleana*), scotch bonnet (*Phalium granulatum*), distorted triton (*Distorsio clathrata*), wentletraps (*Epitonium* sp.), and whelks (*Busycon* spp.). Crustaceans inhabit these waters, including white and brown shrimp (both commercially caught species), rock shrimp (*Sicyonia brevirostris*), blue crabs, mole crabs (*Albunea* spp.), speckled crab (*Arenaeus cribrarius*), box crab (*Calappa sulcata*), calico crab (*Hepatus epheliticus*), and pea crab (*Pinnotheres maculatus*). The most abundant infaunal organisms, with respect to the number of individuals, are the polychaetes (Capitellidae, Orbiniidae, Magelonidae, and Paraonidae) (Britton and Morton 1989).

3.12.4 Artificial Reefs

In the Gulf, there are two types of artificial reefs, those structures placed to serve as oil and gas production platforms and those intentionally placed to serve as artificial reefs (GMFMC 2004). The more than 4,500 oil and gas structures in the Gulf form unique reef ecosystems that extend throughout the water column providing a large volume and surface area, dynamic water-flow characteristics, and a strong profile (Ditton and Falk 1981, Dokken 1997, Stanley and Wilson 1990, Vitale and Dokken 2000). Fish are attracted to oil platforms because these structures provide food, shelter from predators and ocean currents, and a visual reference that aids in navigation for migrating fishes (Bohnsack 1989, Duedall and Champ 1991, Meier 1989, Vitale and Dokken 2000). The size and shape of the structure affect community characteristics of pelagic, demersal, and benthic fishes (Stanley and Wilson 1990). Many scientists feel that the presence of oil platform structures allows for the fish populations to grow, which increases fishery potential (Scarborough-Bull and Kendall 1992).

Artificial reefs are colonized by a diverse array of microorganisms, algae, and sessile invertebrates including shelled forms (barnacles, oysters, and mussels), as well as soft corals (bryozoans, hydroids, sponges, and octocorals) and hard corals (encrusting, colonial forms). These organisms (referred to as the biofouling community) provide habitat and food for many motile invertebrates and fishes (GMFMC 2004).

Mississippi has 14 permitted offshore reefs encompassing 16,000 acres of water bottom and 67 permitted nearshore artificial reef sites. These reefs range in size from 3 to 10,000 acres. The material used for offshore reefs consists of concrete rubble, steel-hull vessels (including barges), armored personnel carriers and materials of design, such as Florida Limestone Pyramids and Reef Balls. The materials of the nearshore reefs consist of limestone, concrete rubble (when water depth allows), crushed concrete, and oyster shells (MDMR 2010). One offshore reef and 5 nearshore reefs are located within the study area (MDMR 2011b, 2011c).

Mississippi's Rigs to Reef Program offers conservation-minded alternatives for the platform, as opposed to onshore disposal with no subsequent habitat value. The average platform jacket can provide up to 2 to 3 acres of hard bottom habitat for marine invertebrates and fishes, and these submerged platform jackets currently provide habitat for thousands of marine species. The program includes 8 permitted reef sites with 14 platform jackets, which are not located within the study area (MDMR 2010).

Species associated with the platforms that are not dependent on the biofouling community for food or cover include transients (move from platform to platform) such as red snapper, Atlantic spadefish (*Chaetodipterus faber*), lookdown (*Selene vomer*), Atlantic moonfish (*Selene setapinnis*), creole-fish (*Paranthias furcifer*), whitespotted soapfish (*Rypticus maculatus*), gray triggerfish (*Balistes capriscus*), and lane snapper, and resident species (always found on the platforms) including red snapper, large tomate (*Haemulon aurolineatum*), and some large groupers. Other resident species that are dependent upon the biofouling community for food or cover include numerous species of blennies, sheepshead, and small grazers (butterflyfishes, Chaetodontidae). Highly transient, large predators associated with these structures include barracuda (*Sphyraena barracuda*), almaco jack (*Seriola rivoliana*), hammerhead sharks (*Sphyrna* spp.), cobia, mackerels (Scombridae), other jacks (*Caranx* spp.), and the little tunny (GMFMC 2004).

3.12.5 Invasive Species in Ballast Water

Ballast water is loaded on empty ships to provide weight and stability while traveling from one port to the next. There are thousands of marine species that can be carried from port to port in ballast water, which may ultimately result in the introduction of unwanted aquatic species from foreign ports of origin (Global Ballast Water Management Programme 2011). As a consequence, invasive, exotic species have been introduced into U.S. waters through ballast water. Ballast water is the largest single vector for nonindigenous species transfer. The EPA has compiled a list of invasive species that have the potential to be unintentionally introduced, although not necessarily through ballast water alone (Table 3.12-2) (EPA 2001a). However, ships such as LNG tankers, are unloading cargo and do not discharge ballast water, but rather, replaced unloaded cargo with ballast water.

The USCG, under the provisions of the National Invasive Species Act, has implemented a program that consists of a suite of mandatory ballast water management protocols. All vessels, foreign and domestic, equipped with ballast water tanks that operate within U.S. waters are required to comply with 33 C.F.R. Part 51 regarding management protocols. This includes submitting a ballast water exchange report to the National Ballast Information Clearinghouse (NBIC) to ensure compliance with the management requirements (USCG 2011a).

According to the NBIC (2011) ballast water–reporting database, between January 1, 2004, and August 4, 2011, a total of 5,678 ballast water exchange reports were submitted for the Port of Pascagoula. Of these, 701 had a discharge location of Pascagoula and all of them were empty/refills exchanges where the ballasted tank is emptied then refilled with ocean water.

Table 3.12-2
Current and Potential Aquatic Species that Pose a Threat to Mississippi

Scientific Name	Common Name	Potential / Current Threat
Shrimp Viruses		
Taura Syndrome Virus	shrimp virus	C
White Spot Syndrome Virus	shrimp virus	C
Coelenterates		
Craspedacusta sowerbyi	freshwater jellyfish	C
Drymonema larsoni	pink meanie	C
Phyllorhiza punctata	spotted jellyfish	P
Roundworms (phylum Nematoda)		
Anguillicola crassus	eel parasite	P
Boccardiella ligerica	spionid worm	C
Mollusks		
Corbicula fluminea	Asian clam	C
Crassostrea gigas	Japanese (or Pacific giant) oyster	C
Dreissena polymorpha	zebra mussel	P
Perna perna	brown mussel	P
Pomacea canalicula	channeled applesnail	C
Crustaceans		
Callinectes bocourti	Bocourt swimming crab	C
Carcinus maenus	green crab	P
Charybdis helleri	marine swimming crab	P
Daphnia lumholtzi	water flea	C
Eriocheri sinensis	Chinese mittencrab	P
Macrobranchium rosenbergii	Malaysian prawn	C
Mesocyclops pehpeiensis	No common name	C
Penaes monodon	Asian tiger shrimp	C
Fishes		
Alosa sapidissma	American shad	C
Carassuis auratus	goldfish	C
Cichlasoma cyanoguttatum	Rio Grande cichlid	C
Ctenopharyngodon idella	grass carp	C
Hypophthalmichthys molitrix	silver carp	C
Hypophthalmichthys nobilis	bighead carp	C
Mylopharyngodon piceus	black carp	P
Morone saxiatilis	striped bass	C
Neogobius melanostomus	round goby	C
Oreochromis aureus	blue tilapia	C
Oreochromis mossambicua	Mozambique tilapia	C
Piaractus brachypomus	red dellied pacu	C
Salmo salar	Atlantic salmon	C

Table 3.12-2, cont'd

Scientific Name	Common Name	Potential / Current Threat
Amphibians		
Eluetherodactylus plainirostris	greenhouse frog	C
Mammals		
Myocastor coypus	nutria	C
Algae		
Aureoumbra lagunensis	brown tide algae	C*
Vascular Plants		
Alternanthera philoxeroides	alligatorweed	C
Eichhornia crassipes	water hyacinth	C
Myriophyllum spicatum	Eurasian watermilfoil	C
Hydrilla verticillata	hydrilla	C
Ipomoea aquatica	waterspinach	P
Lythrum salicaria	purple loosestrife	P
Panicum repens	torpedograss	C
Pistia stratiotes	waterlettuce	C
Salvinia minima	common salvinia	C
Salvinia molesta	giant salvinia	C
Semi-Aquatic Vascular Plants		
Imperata cylindrica	cogongrass	P
Pueraria montana	kudzu	C
Sapium sebiferum	Chinese tallow tree	C

Source: EPA 2001a, USGS 2011, Ray 2005.

P = Potential Threat; C = Current Threat

* = Cryptogenic (a species whose status as indigenous or nonindigenous remains unresolved)

3.13 FISH AND WILDLIFE

This section describes the fish and wildlife that occur within and around the study area. It also includes information on the critical habitat important to marine fisheries as Essential Fish Habitat (EFH). Federally and state-listed species are described in Section 3.14.

3.13.1 Essential Fish Habitat (EFH)

EFH consultation under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) was initiated during this EIS process on November 16, 2011. Congress enacted amendments to the MSFCMA (PL 94-265) in 1996 that established procedures for identifying EFH and required interagency coordination to further the conservation of federally managed fisheries. The MSFCMA is necessary to prevent overfishing, to rebuild overfished stocks, to ensure conservation, to facilitate long-term protection of EFH, and to realize the full potential of the nation's fishery resources. The MSFCMA protects fish and shell fish species in U.S. waters, the highly migratory species of the high seas, the species that dwell on or in the continental shelf of the U.S., and the anadromous species that spawn in U.S. rivers or estuaries, and constitute valuable and renewable natural resources (U.S. Department of Commerce 2007). Rules published by the NMFS (50 C.F.R. sections 600.805–600.930) specify that any Federal agency that authorizes, funds or undertakes, or proposes to authorize, fund, or undertake an activity that could adversely affect EFH is subject to the consultation provisions of the above-mentioned act and identified consultation requirements. A letter (Appendix D) was submitted to NMFS requesting information regarding EFH in the study area.

EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH is separated into estuarine and marine components. The estuarine component is defined as "all estuarine waters and substrates (mud, sand, shell, rock, and associated biological communities), subtidal vegetation (seagrasses and algae), and adjacent intertidal vegetation (marshes and mangroves)." The marine component is defined as "all marine waters and substrates (mud, sand, shell, rock, and associated biological communities) from the shoreline to the seaward limit of the Exclusive Economic Zone" (GMFMC 2004). Adverse effect to EFH is defined as, "any impact, which reduces quality and/or quantity of EFH . . ." and may include direct, indirect, site specific or habitat impacts, including individual, cumulative, or synergistic consequences of actions.

Within areas identified as EFH, Habitat Areas of Particular Concern (HAPC) may be designated in order to focus conservation priorities on areas that are important to the life cycles of federally managed species. Designation of specific HAPCs are based on ecological function, habitats sensitive to human-induced environmental degradation, stressors of development activities, and habitat rarity (Dobrzynski and Johnson 2001). No HAPCs are designated in the study area (NOAA 2011c).

The NMFS and the Gulf of Mexico Fisheries Management Council (GMFMC) have identified the study area as EFH for brown shrimp (*Farfantepenaeus aztecus*), pink shrimp (*Farfantepenaeus duorarum*), white shrimp (*Litopenaeus setiferus*), blacknose shark (*Carcharhinus acronotus*), spinner shark (*Carcharhinus brevipinna*), finetooth shark (*Carcharhinus isodon*), bull shark (*Carcharhinus leucas*), blacktip shark (*Carcharhinus limbatus*), tiger shark (*Galeocerdo cuvier*), Atlantic sharpnose shark (*Rhizoprionodon terraenovae*), scalloped hammerhead shark (*Sphyrna lewini*), great hammerhead shark (*Sphyrna mokarran*), bonnethead shark (*Sphyrna tiburo*), gag (*Mycteroperca microlepis*), cobia (*Rachycentron canadum*), greater amberjack (*Seriola dumerili*), lesser amberjack (*Seriola fasciata*), red snapper (*Lutjanus campechanus*), gray snapper (*Lutjanus griseus*), lane snapper (*Lutjanus synagris*), red drum (*Sciaenops ocellatus*), little tunny (*Euthynnus alletteratus*), king mackerel (*Scomberomorus cavalla*), and Spanish mackerel (*Scomberomorus maculatus*). The categories of EFH that occur within the study area include estuarine water column, estuarine mud and sand bottoms (unvegetated estuarine benthic habitats), artificial structures, and estuarine emergent wetlands, and seagrasses. Additionally, portions of the proposed project located in marine waters include the marine water column, unconsolidated marine water bottoms, and natural structural features.

A summary of Mississippi Sound and offshore federally managed species life stage, seasonal abundance, and preferred habitat for which EFH has been identified in the study area is presented in Table 3.13-1.

3.13.2 Non-Native and Invasive Aquatic Fauna Species

As previously mentioned in subsection 3.11.3.4, aquatic invasive species are a problem because there are abundant pathways of introduction, including commercial shipping, heavy recreational watercraft usage, aquaculture, and the aquarium industry. Those introductions have had unexpected ecosystem, economic, and social impacts (Diaz and Clark 2005). Aquatic invasive species harm native fish and wildlife by taking over native species' habitat and disturbing entire food webs.

According to the USGS web site listing nonindigenous aquatic species identified in Mississippi (USGS 2011), there are 44 nonindigenous aquatic animal species, of which 12 are marine species. In a Mississippi Press article dated November 16, 2011, three invasive aquatic species, silver carp (*Hypophthalmichthys molitrix*), Asian tiger shrimp (*Penaeus monodon*), and lionfish (*Pterois volitans*), were sighted across the northern Gulf of Mexico (Pursley 2012).

The silver carp was of particular concern since it can grow up to 60 pounds and disrupts water bottoms while feeding. However, the silver carp is primarily a freshwater species and sightings so far have been mainly throughout the Mississippi River Valley and as far south as Lake Pontchartrain.

There is concern that the Asian tiger shrimp would compete with native shrimp for habitat and food, and possibly bring disease. Several years ago it was believed that the cold-intolerant Asian tiger shrimp would not survive the colder northern Gulf of Mexico. However, possible selective breeding through aquaculture operations may have helped the tiger shrimp survive in colder waters. Recently, the shrimp has been sighted off Bellefontaine Point, Biloxi Channel, Round Island, and Horn Island.

The lionfish has a voracious appetite and has no natural predators. The lionfish live on reefs, and have been observed off the coast of Alabama (approximately 40 miles south of Dauphin Island), off the coast of Louisiana, along the coast of Florida, and up the East Coast. Although lionfish have been collected offshore from Alabama and Louisiana, the species distribution map for the lionfish does not indicate specimens collected within inshore coastal waters of Louisiana, Mississippi, or Mobile Bay, including the study area of the EIS (USGS 2011).

Table 3.13-1
Life Stages of Federally Managed Species that Occur Within the
Study Area and the Associated Types of Designated EFH

Species	Life Stage	Presence	System*	Habitat Type
Brown shrimp (*Farfantepenaeus aztecus*)	Eggs	Abundant	M	Sand/shell/soft bottom
	Larvae	Highly abundant	M	Sand/shell/soft bottom, SAV, emergent marsh, oyster reef
	Juvenile	Highly abundant to abundant	E/M	Sand/shell/soft bottom, SAV, emergent marsh, oyster reef
	Adult	Highly abundant	E/M	Sand/shell/soft substrate
Pink shrimp (*Farfantepenaeus duorarum*)	Eggs	Common	M	Sand/shell bottom
	Larvae	Common	E/M	Planktonic, sand/shell bottom, SAV
	Juvenile	Common	E/M	Sand/shell bottom
	Adult	Common	E/M	Sand/shell/mud bottom
White shrimp (*Litopenaeus setiferus*)	Eggs	Common	M	Sand/shell/soft bottom
	Larvae	Abundant to common	M	Planktonic
	Juvenile	Highly abundant to common	E	SAV, soft bottom, emergent marsh
	Adult	Highly abundant to common	E/M	Mud/silt/clay, sand bottom
Blacknose shark (*Carcharhinus acronotus*)	Neonate	Not Present		
	Juvenile	Present	E/M	Sand, shell, coral bottoms, marine and estuarine water column
	Adult	Present	E/M	Sand, shell, coral bottoms, marine and estuarine water column
Spinner shark (*Carcharhinus brevipinna*)	Neonate	Not Present		
	Juvenile	Present	E/M	Marine and estuarine water column
	Adult	Present	M	Marine and estuarine water column
Finetooth shark (*Carcharhinus isodon*)	Neonate	Present	E/M	Marine and estuarine water column
	Juvenile	Present	E/M	Marine and estuarine water column
	Adult	Present	E/M	Marine and estuarine water column
Bull shark (*Carcharhinus leucas*)	Neonate	Not Present		
	Juvenile	Present	E/M	Marine and estuarine water column
	Adult	Present	E/M	Marine and estuarine water column
Blacktip shark (*Carcharhinus limbatus*)	Neonate	Present	E/M	Marine and estuarine water column
	Juvenile	Present	E/M	Marine and estuarine water column
	Adult	Present	E/M	Marine and estuarine water column
Tiger shark (*Galeocerdo cuvier*)	Neonate	Not Present		
	Juvenile	Present	E/M	Marine and estuarine water column
	Adult	Not Present		
Atlantic sharpnose shark (*Rhizoprionodon terraenovae*)	Neonate	Present	E/M	Marine and estuarine water column
	Juvenile	Present	E/M	Marine and estuarine water column
	Adult	Present	E/M	Marine and estuarine water column
Scalloped hammerhead shark (*Sphyrna lewini*)	Neonate	Present	E/M	Marine and estuarine water column
	Juvenile	Present	E/M	Marine and estuarine water column
	Adult	Present	E/M	Marine and estuarine water column

Table 3.13-1
Life Stages of Federally Managed Species that Occur Within the
Study Area and the Associated Types of Designated EFH

Species	Life Stage	Presence	System*	Habitat Type
Great hammerhead shark (*Sphyrna mokarran*)	Neonate	Insufficient information for the identification of EFH for this life stage		
	Juvenile	Present	E/M	Marine and estuarine water column
	Adult	Present	E/M	Marine and estuarine water column
Bonnethead shark (*Sphyrna tiburo*)	Neonate	Present	E/M	Marine and estuarine water column
	Juvenile	Present	E/M	Marine and estuarine water column
	Adult	Present	E/M	Marine and estuarine water column
Gag (*Mycteroperca microlepis*)	Eggs	Present	M	Pelagic
	Larvae	Present	M	Pelagic
	Juvenile	Present	M	SAV, reefs, hard bottom
	Adult	Present	M	SAV, reefs, hard bottom
Cobia (*Rachycentron canadum*)	Eggs	Present	M	Planktonic
	Larvae	Present	M	Planktonic
	Juvenile	Present	M	Marine water column
	Adult	Present	E/M	
Greater amberjack (*Seriola dumerilli*)	Eggs	Present	M	Planktonic
	Larvae	Present	M	Planktonic
	Juvenile	Present	M	Marine water column
	Adult	Present	M	Marine water column
Lesser amberjack (*Seriola fasciata*)	Eggs	Present	M	Planktonic
	Larvae	Present	M	Planktonic
	Juvenile	Present	M	Marine water column
	Adult	Present	M	Marine water column
Red snapper (*Lutjanus campechanus*)	Eggs	Not Present	M	Planktonic
	Larvae	Not Present	M	Planktonic
	Juvenile	Present	M	Hard/soft/sand/shell bottom
	Adult	Not Present	M	Reefs, hard/sand/shell bottoms

Table 3.13-1
Life Stages of Federally Managed Species that Occur Within the Study Area and the Associated Types of Designated EFH

Species	Life Stage	Presence	System*	Habitat Type
Gray snapper (*Lutjanus griseus*)	Eggs	Not Present		
	Larvae	Present	M	Planktonic
	Juvenile	Present	E/M	SAV, mangrove, mud
	Adult	Present	E/M	SAV, mangrove, sand, mud
Lane snapper (*Lutjanus synagris*)	Eggs	Not Present		
	Larvae	Not Present		
	Juvenile	Present	E/M	SAV, mangrove, sand, mud
	Adult	Present	M	Reefs, sand
Red drum (*Sciaenops ocellatus*)	Eggs	Common	M	Pelagic
	Larvae	Abundant to common	E	Planktonic, SAV, sand/shell/soft bottom, emergent marsh
	Juvenile	Common	E/M	SAV, sand/shell/soft/hard bottom, emergent marsh
	Adult	Common	E/M	SAV, sand/shell/soft/hard bottom, emergent marsh, estuarine/marine water column
Little tunny (*Euthynnus alletteratus*)	Eggs	Present	M	Planktonic
	Larvae	Present	M	Planktonic
	Juvenile	Present	E/M	Estuarine and marine water column
	Adult	Present	E/M	Estuarine and marine water column
King mackerel (*Scomberomorus cavalla*)	Eggs	Present	M	Planktonic
	Larvae	Present	E/M	Planktonic
	Juvenile	Common	E/M	Estuarine and marine water column
	Adult	Common	E/M	Estuarine and marine water column
Spanish mackerel (*Scomberomorus maculatus*)	Eggs	Present	M	Planktonic
	Larvae	Present	M	Planktonic
	Juvenile	Common	E/M	Estuarine and marine water column
	Adult	Common	E/M	Estuarine and marine water column

Source: GMFMC 2004, Nelson et al. 1992, Pattillo et al. 1997, Compagno 1984, NMFS 2006a and 2011a, NOAA 2011a, 2011b, 2011c, and 2011d
* E = estuarine; M = marine

3.13.3 Recreational and Commercial Fisheries

The fisheries associated in the proposed project area represent a wide array of species from both nearshore and offshore taxa. Christmas and Waller (1973) report that 98 percent of the fishes collected in Mississippi Sound were also present in offshore trawl samples. The majority of the fish species present are estuarine-dependent for part of their life cycle. Typically, these species spawn in the Gulf of Mexico and the larvae (ichthyoplankton) are carried inshore to estuaries to mature (EPA 1991). These small, immature forms are susceptible to flow regime changes around the barrier islands (Horn and Petit Bois islands) where the surrounding grassbeds provide nursery grounds. The greatest abundance of larvae occurs in the spring and summer. There were 69 species of ichthyoplankton recorded from the Horn Island surf zone, which were dominated in numerous studies (Ross 1982). The dominant ecological groups inhabiting Mississippi Sound are drum, various flat fishes, and cusk eels. The most common species found in one survey of the Mississippi Sound were Atlantic croaker (*Micropogonias undulatus*), speckled worm eel (*Myrophus punctatus*), and southern flounder (*Paralichthys lethostigma*).

In the recent past, two dramatic events have had an impact on the fishes of Mississippi Sound: Hurricane Katrina and the Deep Water Horizon oil rig explosion and subsequent oil spill. Hurricane Katrina pushed a large amount of saltwater up into the rivers and freshwater marshes of Mississippi. Low DO caused numerous fish kills along the coast and near the mouths of the rivers. Changes in the community structure of the lower Pascagoula River were observed immediately after the hurricane, and some of these changes have persisted because of hurricane induced habitat changes (Schaefer et al. 2006). On May 25, 2010, U.S. Commerce Secretary Gary Locke declared a fishery resource disaster for affected fisheries in water off Louisiana, Mississippi, and Alabama due to the Deepwater Horizon oil rig explosion and oil spill (Locke 2010). As a result of the oil spill, 95 percent of Mississippi State waters were closed to commercial and recreational fishing. All Mississippi State waters were reopened in July 2010, after the well-head was capped and oil stopped flowing into the Gulf (Upton 2011). Although the fisheries are open, the full impact of these two events is still being evaluated.

The main commercial fisheries species in Mississippi Sound are blue crab (*Callinectes sapidus*), flounder (*Paralichthys* spp.), Gulf menhaden (*Brevoortia patronus*), striped mullet (*Mugil cephalus*), eastern oyster (*Crassostrea virginica*), red snapper, brown shrimp, white shrimp, and pink shrimp. The top commercial species include menhaden, shrimp, and oysters (NMFS 2011b). Mississippi has the smallest income ($113 million) and employment (6,400 jobs) impacts from commercial fisheries in the Gulf of Mexico (NMFS 2011b).

Key coastal recreational species in the study area include Atlantic croaker, southern (*Menticirrhus americanus*) and gulf kingfish (*Menticirrhus littoralis*), sand (*Cynoscion arenarius*) and silver seatrout (*Cynoscion nothus*), spotted seatrout (*Cynoscion nebulosus*), sheepshead (*Archosargus probatocephalus*), red drum (*Sciaenops ocellatus*), red snapper, sharks, southern flounder, and striped mullet (NMFS 2011b). Recreational fisherman spent $700,000 in fishing equipment and trips in 2009 (NMSF 2011b). Pascagoula and nearby surrounding communities make up Mississippi's top fishing region (NMFS 2011b).

Life cycle information of important recreational and commercial aquatic species is included here to facilitate understanding of how and when these species use estuarine habitat in the study area.

Blue crabs. Female blue crabs mate and migrate to the higher salinity areas of the estuary (near tidal inlets or just offshore) where they lay their eggs. These eggs are attached to the underside of their abdomen and are brooded in this capacity for about 2 weeks. Prior to egg hatching, females move seaward and hatch offshore. The larvae pass through several larval stages in the marine plankton before they begin to move back into the estuary with the surface plankton. Female blue crabs occur in the bay year round, but peak in June and July, whereas males remain in the lower salinity portions of the bay throughout their life (Britton and Morton 1989).

Southern flounder. Adult southern flounder leave the bay for offshore waters to spawn during the late fall and early winter. Eggs and sperm are randomly released into the water column for fertilization. Immediately after spawning, adults return to the estuaries and rivers. Larval flounder remain offshore in the plankton for 4 to 8 weeks, then metamorphosis begins and the larvae are carried into the estuaries. Juvenile southern flounders begin migrating to low-salinity water up rivers, where, according to some researchers, juvenile and young adults remain for the first 2 years. Once they reach sexual maturity (2 years) they begin migrating to the Gulf to spawn (Daniels 2000, Pattillo et al. 1997).

Gulf menhaden. Gulf menhaden spawning in the wild has not been observed. Most spawning probably occurs off the Mississippi and Atchafalaya river deltas from nearshore to about 60 miles offshore. Spawning season usually runs from October through March. This is an estuary dependent, marine migratory species. Eggs and larvae spend 3 to 5 weeks in offshore waters as currents carry them into estuaries. The Gulf menhaden do not exhibit an extensive migratory pattern. Adults and maturing juveniles migrate from estuaries to open Gulf waters to overwinter or spawn (Pattillo et al. 1997).

Striped mullet. Striped mullet spawning occurs offshore near the water's surface from October to March. Eggs and sperm are randomly released into the water column for fertilization. The eggs and larvae remain offshore where they develop into prejuveniles, then enter the bays and estuaries to mature. Sexual maturity occurs at 3 years of age; adults remain near inshore waters during their life (Pattillo et al. 1997).

Eastern oysters. Eastern oysters spawn in the spring. Rising temperatures and chemical cues stimulate the release of sperm into the water column by males. When this occurs, the female oysters release their eggs into the water. Larval oysters prefer estuarine conditions. They will remain as plankton in the water column for 2 or 3 weeks before settling onto a hard substrate and eventually transforming into an adult (Britton and Morton 1989).

Red snapper. Red Snapper spawn in summer and fall in the Gulf and usually show partial sexual maturity at 1 year and full maturity at 2 years. They spawn primarily away from reefs and over a firm sand bottom with little relief at depth of 15 to 121 feet. Adult red snapper exhibit little movement during cooler months and move closer to shore in summer months (Moran 1988).

Shrimp. Brown, pink, and white shrimp all have similar life cycles. All spawning occurs in the Gulf. Male shrimp transfer sperm to the female, who carries it around until she releases the eggs to be fertilized by the sperm. Eggs hatch into the larval stage within 24 hours and remain in the Gulf, undergoing various larval stages for several weeks. Post-larvae are carried by the currents into the shallow areas of the estuary, tidal creeks, and marshes to mature. Here the shrimp increase in size and soon move to the deeper waters of the estuary, eventually moving offshore in the Gulf to spawn. Peak spawning season for brown shrimp occurs from September to May, and for pink and white shrimp, March to September (Britton and Morton 1989).

Atlantic croaker. Eggs and sperm of the Atlantic croaker are randomly released into the water column for fertilization. Spawning occurs nearshore in the Gulf and near passes, from September to May. Early larval stages are found offshore in plankton and are carried by currents inshore to estuarine areas. Juvenile Atlantic croaker move into rivers and creeks where they spend 6 to 8 months. Adults migrate offshore in March and April (Patillo et al. 1997).

Southern kingfish. This species spawns in the nearshore coastal waters in the spring through the fall declining from June to September. Juveniles stay near channels and along the coast. Animals that live in sediment are an important food source (Harding 1987).

Gulf kingfish. Gulf kingfish favor high energy areas such as waves that suspend small crabs upon which they can feed. Spawning season occurs from May through October on the outer continental shelf.

Sand seatrout. Sand seatrout migrate to the Gulf in late fall or winter to spawn. Eggs and sperm are randomly released into the water column for fertilization. Larvae are carried into the estuary by the currents and migrate to the upper areas of the estuary, preferring channels, small bayous, and shallow marshes to develop. Adult sand seatrout reach sexual maturity at 12 months (Pattillo et al. 1997).

Silver seatrout. The silver seatrout spawns from early May to October in the Gulf. The juveniles prefer estuarine and nearshore waters. Adults can be typically found more offshore. Silver seatrout in Gulf waters become more abundant as the distance from the shore increases (Sutter 1987).

Spotted seatrout. Spotted seatrout spawn generally from March to October. Eggs are pelagic or demersal depending on salinity; initially, larvae are pelagic and become demersal after 4 to 7 days. Juveniles and adults are demersal, completing their entire life cycle in inshore waters. Adult seatrout migrate very little with most movements occurring seasonally in association with thermal and salinity tolerances, and with spawning activates (Pattillo et al. 1997).

Sheepshead. Sheepshead spawn offshore during March and April. Eggs and sperm are randomly released into the water column for fertilization. The larvae move into the seagrass beds of the estuary. They remain in this planktonic stage for 30 to 40 days, and then metamorphose into juveniles. The juveniles "settle out" in the seagrass beds becoming substrate-oriented, then move to nearshore reefs where they mature. Sheepshead reach sexual maturity by age 2 (Pattillo et al. 1997).

Red drum. Red drum are dependent on estuaries for each part of their life cycle. Eggs are spawned near waters close to shore, barrier island passes and channels. The larvae move to shallow slack waters to avoid being carried out during ebb tides and as protection from predators. Juveniles also prefer the shallow protected waters of the estuaries but older juveniles have been found in deeper more open waters. Adults are typically found in the littoral and shallow nearshore waters of the Gulf, but are found offshore where they are fished (Pattillo et al. 1997).

3.13.4 Commercially and Recreationally Important Terrestrial Species

Many species of wildlife that occur within the study area provide human consumptive benefits through hunting and trapping (MDWFP 2011). White-tailed deer (*Odocoileus virginianus*) is one of the most sought after game species in the study area and the eastern wild turkey (*Meleagris gallopavo silvestris*) is also an important game species. Although waterfowl distribution and abundance is concentrated in the Mississippi Delta Valley (MDWFP 2009) outside of the study area, some hunting occurs in the study area with the primary species being mallards (*Anas platyrhynchos*) and wood ducks (*Aix sponsa*). Small game in Mississippi includes squirrels (*Sciurus* spp.), rabbits (*Sylvilagus* spp.), bobwhite quail (*Colinus virginianus*), and mourning doves (*Zenaida macroura*). In addition to the aforementioned species, bobcat (*Lynx rufus*), red (*Vulpes vulpes*) and gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), and coyote (*Canis latrans*) are also taken by hunting in the study area (MDWFP 2011).

Furbearers of economic and recreational importance are known to occur in the study area and are generally more abundant in woodlands, especially bottomland forests. Species such as mink (*Neovison vison*), raccoons, muskrat (*Ondatra zibethicus*), red and gray foxes, bobcats, opossum, otter (*Lontra canadensis*), eastern spotted skunk (*Spilogale putorius*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), weasels (*Mustela frenata*), nutria (*Myocastor coypus*), and beaver (*Castor canadensis*) are trapped (Hunt and Hutt 2010).

3.13.5 Other Terrestrial Wildlife

Given the heterogeneity of habitat in the study area that includes "piney woods," natural levees, wetlands, bottomland hardwood forests, marshes, dunes, beaches, barrier islands, streams, and rivers, it is likely that a variety of common species occur within the study area with the exception of those species that are designated threatened or endangered (see Section 3.14). However, because of the urbanization and industrialization directly associated with the Bayou Casotte Channel, many of the species requiring "natural" habitats are not likely to be present. Only those species that are the most common, generalist species would be expected to be present.

Amphibians. Eighteen species of salamanders and 22 species of frogs and toads are known to occur in coastal Alabama and Mississippi (MMNS 2008, NatureServe 2011). Salamanders in general require moist environments, some being fully aquatic, some intermittently aquatic, and some terrestrial. Although likely to occur in the study area, the need for a constant source of salt-free moisture makes it unlikely that many occur on land contingent to the proposed project. Although it is less likely that frogs are found, common species of toads such as *Bufo* sp. are likely found on land adjacent to the proposed project, as well as throughout the study area. Common tree frogs (*Hyla* spp.) such as the green tree frog (*Hyla cinerea*) may also be found where adequate moisture is available.

Reptiles. Coastal Alabama and Mississippi are home to 39 species of snakes, 10 species of lizards, 23 species of turtles, and 1 crocodilian (MMNS 2008, USACE 2009a, NatureServe 2011). Reptiles are ubiquitous to the study area and common species of snakes such as the garter snake (*Thamnophis sirtalis*) are likely to occur on land contingent to the Bayou Casotte Channel. Common anoles and skinks such as the green anole (*Anolis carolinensis*) and the five-lined skink (*Plestiodon fasciatus*) are also likely to occur. Terrestrial turtles like the box turtle (*Terrapene carolina*) may be found in small numbers, but suitable habitat for burrowing is limited.

Birds. Numerous avian species are found within the study area (NatureServe 2011). Mississippi is situated in the eastern portion of the Mississippi Flyway. Although the alluvial valley of northwestern Mississippi hosts the most waterfowl and neotropical migrants, it is likely that the study area holds moderate numbers of overwintering waterfowl, especially wood ducks and mallards (Turcotte and Watts 1999). Migratory birds such as the neotropical migrants, colonial-nesting birds, and shorebirds are protected under the Migratory Bird Treaty Act of 1918, as amended.

Neotropical migrants typically cross the Gulf from the Yucatan Peninsula to Texas through Florida along the Gulf Coast. Most are the perching birds such as finches (*Carpodacus* spp.), warblers (*Dendroica* spp., *Vermivora* spp., *Wilsonia* spp.), buntings (*Passerina* spp.), and sparrows (*Passerculus* spp., *Spizella* spp., *Wilsonia* sp., *Zonotrichia* spp.), but also include ruby-throated hummingbirds (*Archilochus colubris*) and yellow-billed cuckoos (*Coccyzus americanus*) (Moore et al. 1990, Turcotte and Watts 1999, Mississippi Coast Audubon Society [MCAS] 2010). The bottomland hardwoods, maritime forests, and scrub-shrub associated with the coastal zone and barrier islands provide the last foraging opportunity before crossing the Gulf and the first potential landfall upon return. Neotropical migrants known to use the coastal fringe and barrier islands in Mississippi include the veery (*Catharus fuscescens*), Swainson's thrush (*Catharus ustulatus*), wood thrush (*Hylocichla mustelina*), vireos (*Vireo* spp.), tanagers (*Piranga* spp.), blue grosbeak (*Passerina caerulea*), rose-breasted grosbeak (*Pheucticus ludovicianus*), and orchard oriole (*Icterus spurius*) (Moore et al. 1990, Turcotte and Watts 1999, MCAS 2010, NatureServe 2011).

Habitat in the study area is also conducive for use by colonial-nesting birds. Colonial-nesting birds are defined by commonalities (USFWS 2002). They tend to nest in large colonies and consume mostly fish and aquatic invertebrates. They are usually divided into two groups based on where they feed: colonial seabirds and colonial-wading birds. Colonial seabirds feed primarily in saltwater habitats. In Mississippi, these include the American white pelican (*Pelecanus erythrorhynchos*), brown pelican (*Pelecanus occidentalis*), magnificent frigate bird (*Fregata magnificens*), double-crested cormorant (*Phalacrocorax auritus*), gulls, such as Bonaparte's gull (*Chroicocephalus philadelphia*), ring-billed gull (*Larus delawarensis*), and laughing gull (*Leucophaeus atricilla*), and terns, such as gull-billed tern (*Gelochelidon nilotica*), caspian tern (*Hydroprogne caspia*), common tern (*Sterna hirundo*), and royal tern (*Thalasseus maximus*) (Turcotte and Watts 1999).

Colonial-wading birds primarily feed in fresh and brackish water, either by wading or standing still to catch prey. In Mississippi, these include the American bittern (*Botaurus lentiginosus*), least bittern (*Ixobrychus exilis*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), reddish egret (*Egretta rufescens*), cattle egret (*Bubulcus ibis*), green heron (*Butorides virescens*), black-crowned night heron (*Nycticorax violaceus*), yellow-crowned night heron (*Nycticorax violacea*), white ibis (*Eudocimus albus*), glossy ibis (*Plegadis falcinellus*), and roseate spoonbill (*Platalea ajaja*) (Turcotte and Watts 1999).

The Gulf Barrier Islands and Coastal Marshes Ecoregion associated with the region provides habitat required for shorebird migration, roosting, and nesting. Shorebirds inhabit shallowly flooded coastal and freshwater wetlands, intertidal mudflats, shallowly flooded agricultural fields, dry grasslands, and sandy coastal beaches (Helmers 1992). Six species of shorebirds are known to breed in the Gulf region and almost 40 species occur during migrational or wintering periods (Turcotte and Watts 1999). The snowy plover (*Charadrius alexandrinus*), Wilson's plover (*Charadrius wilsonia*), killdeer (*Charadrius vociferus*), willet (*Tringa semipalmata*), black necked stilt (*Himantopus mexicanus*), and American oystercatcher (*Haematopus palliatus*) breed in the northern Gulf region on coastal beaches, barrier island beaches, salt marshes, and dredged material islands. Wintering populations include the threatened piping plover (*Charadrius melodus*) and other plovers such as the black-bellied plover (*Pluvialis squatarola*), snowy plover, and killdeer; the long-billed curlew (*Numenius americanus*); various small sandpipers such as sanderlings (*Calidris alba*), western sandpiper (*Calidris mauri*), and least sandpiper (*Calidris minutilla*); medium sandpipers such as red knots (*Calidris canutus*), short-billed dowitchers (*Limnodromus griseus*), and snipes (*Gallinago* spp.); marbled godwit (*Limosa fedoa*); various yellowlegs (*Tringa* spp.); turnstones (*Arenaria interpres*), avocets (*Recurvirostra americana*); and Wilson's phalaropes (*Phalaropus tricolor*).

Petit Bois and Horn Islands are part of the GUIS and are managed by the National Park Service (NPS 2011). These barrier islands provide critical habitat for colonial-nesting birds, including threatened and endangered birds (see Section 3.12), as well as a stopover for neotropical migrants. The National Audubon Society (NAS) has also established an Important Bird Area that encompasses the GUIS due to the islands use by neotropical migrants (NAS 2011).

Mammals and marsupials. One species of marsupial, the Virginia opossum is common throughout the study area (USACE 2009a). It is unlikely that the opossum resides on land contingent to the proposed project because of the lack of suitable habitat, but it may use portions of the area to feed.

Approximately 57 species of mammals are known to occur in coastal Mississippi (Jones and Carter 1989, USACE 2009a). Moles, shrews, and bats are common inhabitants of coastal Mississippi. The nine-banded armadillo (*Dasypus novemcinctus*) is common as well as the eastern cottontail (*Sylvilagus floridanus*) and the swamp rabbit (*Sylvilagus aquaticus*). The swamp rabbit is known to inhabit Horn Island. Rodents including squirrels and various mice and rats occur throughout coastal Mississippi. Beaver, muskrat, nutria, and river otters (*Lontra canadensis*) are present where there is suitable aquatic habitat. Carnivores such as coyotes and red and gray fox are known to occur throughout Mississippi and likely occur in the study area, as well as raccoons (*Procyon lotor*) and the striped skunk. Even-toed ungulates such as white-tailed deer and feral pigs (*Sus scrofa*) are likely to occur within the study area; feral pigs have been reported on Horn Island in the past (Jones and Carter 1989).

Although most of the mammal species are likely to occur in the study area, the land adjacent to the proposed project is mostly devoid of suitable habitat for most mammals with the exception of the most common such as mice, rats, and possibly bats. Some mammals such as rabbits, coyotes, and armadillos may traverse the land adjacent to the proposed project.

3.14 THREATENED AND ENDANGERED SPECIES

The Endangered Species Act (16 U.S.C. 1531 et seq.) of 1973 (ESA), as amended, was enacted to provide a program for the preservation of threatened and endangered species and to provide protection for the ecosystems upon which the species depend for their survival. All Federal agencies are required to implement protection programs for these designated species and to use their authorities to further the purpose of the Act. The USFWS and NMFS are the primary agencies responsible for implementing the ESA. The USFWS is responsible for flora and fauna, including freshwater species, while the NMFS is responsible for non-bird marine species.

The USFWS and NMFS have identified 32 federally listed threatened and endangered species as potentially occurring in the study area (tables 3.14-1 and 3.14-3). The ESA defines a threatened species as "a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" and an endangered species as "a species that is in danger of extinction throughout all or a significant portion of its range" (50 C.F.R. 424.02; USFWS 2010).

When a species is listed as threatened or endangered, the ESA requires the designation of critical habitat unless designation would not be prudent or the critical habitat is not determinable. Critical habitat is defined as "(1) the specific areas within the geographical area currently occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (i) essential to the conservation of the species, and (ii) that may require special management considerations or protection, and (2) specific areas outside the geographical area occupied by a species at the time it is listed upon a determination by the Secretary [Secretary of the Interior or the Secretary of Commerce] that such areas are essential for the conservation of the species" (USFWS 2010). Federal agencies are required to consult with the USFWS or NMFS about the effect of actions they authorize, fund, or carry out, on designated critical habitat. Critical habitat has been designated in the vicinity of the study area for the endangered Mississippi sandhill crane (*Grus canadensis pulla*), the threatened piping plover (*Charadrius melodus*), and the threatened Gulf sturgeon.

The Mississippi Natural Heritage Program (MNHP) maintains an updated inventory of plants and animals that are rare or imperiled at the state level. The database includes threatened and endangered species listed under the Federal ESA, the Mississippi State Nongame and Endangered Species Act, and additional rare species not listed officially (MMNS 2011). A total of 80 species and subspecies of plants and animals were officially recognized as federally and state-listed endangered species in 2003 for the state of Mississippi, (not including whales [MNHP 2011]), of which 19 species may occur within the study area based on the updated database.

In accordance with the provisions of the ESA, information was requested regarding protected, proposed, and candidate species and critical habitat that may occur in the vicinity of BCHIP project. A letter was received from USFWS on November 29, 2011 identifying plant and animal species that could be impacted by the proposed project, including the species identified in subsection 3.14.2, Terrestrial Threatened and Endangered Species. A response was received from NMFS's Protected Resources Division, dated January 12, 2012, that provided additional information on protected species and critical habitat that have a potential to occur in the study area including the threatened Gulf sturgeon (Table 3.14-1).

3.14.1 Marine Threatened and Endangered Species

Six of the 19 species listed in Table 3.14-1 are not protected under the ESA, but have been identified by NMFS as species of concern within Mississippi that may warrant listing in the future.

Table 3.14-1
List of Marine Species Potentially Occurring Within the Study Area

Common Name	Scientific Name[1]	Status
MAMMALS		
Finback whale	*Balaenoptera physalus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered
Blue Whale	*Balaenoptera musculus*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
West Indian Manatee	*Trichechus manatus*	Endangered
Lousiana Black Bear	*Ursus americanus luteolus*	Threatened
REPTILES		
Loggerhead sea turtle	*Caretta caretta*	Threatened
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Green sea turtle	*Chelonia mydas*	Threatened
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
FISH		
Gulf sturgeon	*Acipenser oxyrhynchus desotoi*	Threatened
Alabama shad	*Alosa alabamae*	Species of concern
Dusky shark	*Carcharhinus obscurus*	Species of concern
Sand tiger shark	*Carcharias taurus*	Species of concern
Speckled hind	*Epinephelus drummondhayi*	Species of concern
Warsaw grouper	*Epinephelus nigritus*	Species of concern
Opossum pipefish	*Microphis brachyurus lineatus*	Species of concern
Scalloped hammerhead shark	*Sphyrna lewini*	Candidate species

[1] Nomenclature and taxonomic orders follow USFWS (2011b, 2011c, 2011d, 2011e, 2011f, 2011g, 2011h); Integrated Taxonomic Information System (ITIS 2011); MMNS (2011).

3.14.1.1 Mammals

Whales

Whales are listed as endangered species under the ESA and their occurrence has been documented in the Gulf of Mexico. However, depth and accessibility typically preclude their presence in Mississippi Sound. Of the several species of whale, the Gulf of Mexico is home to a population of over 1,000 sperm whales (*Physeter macrocephalus*) year-round, but sightings are most common in the summer (NMFS 2011e). No whales are expected to occur in the study area due to the lack of water depth in Mississippi Sound.

3.14.1.2 Reptiles

Loggerhead Turtle (*Caretta caretta*)

The loggerhead sea turtle is widely distributed in tropical and subtropical seas, being found in the Atlantic Ocean from Nova Scotia to Argentina, the Gulf, Indian, and Pacific oceans (although it is rare in the eastern and central Pacific), and the Mediterranean Sea (Iverson 1986; Rebel 1974; Ross 1982). In the continental U.S., loggerheads nest along the Atlantic coast from Florida to as far north as New Jersey (Musick 1979) and sporadically along the Gulf Coast, including Mississippi. The loggerhead prefers shallow inner continental shelf waters and occurs only very infrequently in the bays. It is often seen around offshore oil rig platforms, reefs, and jetties. Loggerheads are probably present year-round but are most noticeable in the spring when one of their food items, the Portuguese man-o-war, is abundant. The loggerhead occasionally nests on Mississippi's offshore barrier island. One nest was documented on Round Island at the mouth of the Pascagoula River in 1999, and rarely a nest will be placed on the mainland beach (MMNS 2001).

Leatherback Sea Turtle (*Dermochelys coriacea*)

The leatherback sea turtle is probably the most wide-ranging of all sea turtle species. It occurs in the Atlantic, Pacific, and Indian oceans; as far north as British Columbia, Newfoundland, Great Britain, and Norway; as far south as Australia, Cape of Good Hope, and Argentina; and in other water bodies such as the Mediterranean Sea (National Fish and Wildlife Laboratory 1980). The leatherback is mainly pelagic, inhabiting the open ocean, and seldom approaches land except for nesting (Eckert 1992) or when following concentrations of jellyfish (Texas Parks and Wildlife Department 2006). It dives almost continuously, often to great depths. Leatherbacks nest primarily in tropical regions and only sporadically in some of the Atlantic and Gulf of Mexico states of the continental U.S., with one nesting reported as far north as North Carolina (Schwartz 1976). In the Atlantic and Caribbean, the largest nesting assemblages occur in the U.S. Virgin Islands, Puerto Rico, and Florida (NMFS 2006b). No nests of this species have been recorded on Mississippi beaches or barrier islands. In Mississippi waters, the leatherback is observed sporadically. A group of at least six was observed feeding on jellyfish neat Petit Bois Island in 2000 (MMNS 2011). The leatherback sea turtle is likely to pass through the study area, but would not be a resident of Mississippi Sound.

Green Sea Turtle (*Chelonia mydas*)

The green sea turtle is a circumglobal species in tropical and subtropical waters. In U.S. Atlantic waters, it occurs around the U.S. Virgin Islands, Puerto Rico, and continental U.S. from Massachusetts to Texas. Major nesting activity occurs on Ascension Island, Aves Island (Venezuela), Costa Rica, and in Surinam. Relatively small numbers nest in Florida, with even smaller numbers in Georgia, North Carolina, and Texas (Hirth 1997, NMFS and USFWS 1991). The green turtle inhabits shallow bays and estuaries where its principal foods, the various marine grasses, grow (Bartlett and Bartlett 1999). While green turtles prefer to inhabit bays with seagrass meadows, they may also be found in bays that are devoid of seagrasses. The turtles are not known to nest on the Mississippi coast or barrier islands, but might be attracted to seagrass beds as a food source in nearshore waters (Gunter 1981, McKay et al. 2001). Although seagrasses occur on Petit Bois, Horn Island, and in West Grand Bay, no seagrasses occur in the project area. A website clearinghouse for tracking sea turtles in the Gulf of Mexico show no green sea turtles have been found in Mississippi or the upper Gulf Coast (2012 http://www.gturtle.net/); therefore, this species is unlikely to occur in the study area.

Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)

The Kemp's ridley, the smallest of the sea turtles, inhabits shallow coastal and estuarine waters, usually over sand or mud bottoms. Adults are primarily restricted to the Gulf, although juveniles may range throughout the Atlantic Ocean since they have been observed as far north as Nova Scotia (Musick 1979) and in coastal waters of Europe (Brongersma 1972). Almost the entire population of Kemp's ridleys nest on an 11-mile stretch of coastline near Rancho Nuevo, Tamaulipas, Mexico, approximately 190 miles south of the Rio Grande. Kemp's ridleys do not nest in Mississippi, but juveniles are regularly seen in both Mississippi Sound and around the barrier islands due to its crab-rich shallow waters (MMNS 2001).

The Institute of Marine Mammal Studies (IMMS) released six satellite-tagged Kemp's ridleys in November 2010 in the Mississippi Sound and released ten in April 2011 of which six were satellite tagged off the coast of Cedar Key, Florida. The majority of these sea turtles were captured by fisherman in Waveland, Mississippi, outside the study area, just west of Bay St. Louis (IMMS 2011). This species is likely to pass through the study area, but would not be a resident of Mississippi Sound.

Hawksbill Sea Turtle (*Eretmochelys imbricata*)

Hawksbill sea turtles are distinguished from other sea turtles by two pairs of prefrontal scales; thick, posteriorly overlapping carapace scutes; four pairs of costal scutes, the anterior-most not in contact with the nuchal scute; and two claws on each flipper (NMFS and USFWS 1993). The snout is pointed and beaklike. The young are all black or dark brown except light brown raised ridges, shell edges, and areas on the neck and flippers; adult carapace length averages 767.8 cm (Plotkin 1995).

The hawksbill sea turtle was listed as endangered on June, 2, 1970, throughout its range in tropical and temperate seas. Hawksbills are widely distributed in tropical and subtropical seas, but due to heavy exploitation from the tortoiseshell trade and subsistence purposes, their populations are likely still declining. They use a wide range of habitats including shallow coastal waters, coral reefs, seagrass beds, mangrove bays and estuaries and submerged mud flats (NMFS 1993). Hawksbill sea turtles are likely to pass through the study area, but would not be a resident of Mississippi Sound due to rare encounters in northern latitudes.

3.14.1.3 Fish

Gulf Sturgeon (*Acipenser oxyrhynchus desotoi*)

The Gulf sturgeon was listed throughout its range as a threatened subspecies on September 30, 1991, but critical habitat was not designated until March 2003. On March 19, 2003, USFWS and NOAA designated 14 geographic areas among the Gulf of Mexico's rivers and tributaries as critical habitat for the Gulf sturgeon (Fed. Reg. Vol. 68, No. 53). These 14 geographic areas (described as Units) encompass approximately 1,739 river miles and 2,333 square miles of estuarine and marine habitat. In Mississippi, the critical habitat includes 244 miles of the Pearl River, including Bogue Chitto, and 126 miles of the Pascagoula River, including the Leaf, Bouie, Chickasawhay, and Big Black Creek tributaries (Fed. Reg. Vol. 68, No. 53). Units 2 and 8 fall within the study area. Unit 2 of the designated critical habitat for the Gulf sturgeon includes the Pascagoula River and Unit 8 encompasses 62 square miles of the Mississippi Sound nearshore area.

In Unit 2, Gulf sturgeons use the West and East distributaries of the Pascagoula River during spring and fall migrations (Ross et al. 2001). Summer holding areas have been consistently documented on the Pascagoula River (Ross et al. 2001, 2009). The Pascagoula River Harbor in the East Pascagoula River distributary, and is a small portion of this overall unit, but used for migration for all life history stages and possibly as nursery and feeding for juveniles. All of the Federal navigation channels in Pascagoula Harbor are excluded from designation by NMFS and USFWS under Section 4(b)(2), major shipping channels.

Unit 8 encompasses a much larger area than the proposed project, including Lake Pontchartrain, The Rigolets, Lake St. Catherine, Lake Borgne, Heron Bay, and the Mississippi Sound. The portion of Unit 8 within the study area includes Mississippi Sound and adjacent open bays (Pascagoula Bay, Point aux Chenes Bay) and barrier island passes (Horn Island Pass, Petit Bois Island, and Petit Bois Pass) up to 1.2 miles offshore of the barrier islands.

The Pascagoula River and its distributaries flow into Pascagoula Bay and Mississippi Sound. This unit provides juvenile, sub-adult and adult feeding, resting, and passage habitat for Gulf sturgeon from the Pascagoula and the Pearl River subpopulations. Both of these subpopulations have been documented by tagging data, historic sightings, and incidental captures as using Pascagoula Bay, The Rigolets, the eastern half of Lake Pontchartrain, Little Lake, Lake St. Catherine, Lake Borgne, Mississippi Sound, within 1 nm of the nearshore Gulf of Mexico adjacent to the barrier islands and within the passes (Davis et al. 1970; Reynolds 1993; Rogillio et al. 2007; Morrow et al. 1998a; Ross et al. 2001, 2009). Substrate in these areas ranges from sand to silt, all of which contain known Gulf sturgeon prey (Menzel 1971, Abele and Kim 1986, and American Fisheries Society 1989).

Mississippi Sound is separated from the Gulf of Mexico by a chain of barrier islands, including Cat, Ship, Horn, and Petit Bois Islands. Natural depths of between 12 to 18 feet are found throughout the Sound. Incidental captures and recent studies confirm that both Pearl River and Pascagoula River adult Gulf sturgeon winter in the Mississippi Sound, particularly around barrier islands and barrier island passes (Reynolds 1993, Ross et al. 2001, and Rogillio et al. 2007).

Gulf sturgeon exiting the Pascagoula River move both east and west, with telemetry locations as far east as Dauphin Island and as far west as Cat Island and the entrance to Lake Pontchartrain, Louisiana (Ross et al. 2001). Tagged Gulf sturgeon from the Pearl River subpopulation have been located between Cat Island, Ship Island, Horn Island, and east of Petit Bois Island to the Alabama state line (Rogillio et al. 2007). Gulf sturgeon have also been documented within 1 nm off the barrier islands of Mississippi Sound; therefore, the NMFS and USFWS have included 1 nm offshore of the barrier islands of Mississippi Sound. Habitat used by Gulf sturgeon in the vicinity of the barrier islands is 6.2 to 19.4 feet deep (average 13.8 feet), with clean sand substrata (Heise et al. 1999, Ross et al. 2001, Rogillio et al. 2007). Preliminary data from substrate samples taken in the barrier island areas indicate that all samples contained lancelets (Ross et al. 2001). Inshore locations where Gulf sturgeon were located (Deer Island, Round Island) were 6.2 to 9.2 feet deep and all had mud (mostly silt and clay) substrata (Heise et al. 1999), typical of substrates supporting known Gulf sturgeon prey.

The Gulf sturgeon, considered a subspecies of the Atlantic sturgeon, is an anadromous fish, migrating from saltwater into large coastal rivers. Historically, the Gulf sturgeon occurred in rivers from the Mississippi River to the Suwannee River, and in bays and estuaries from Florida to Louisiana. As an anadromous species, it uses the Mississippi Sound for overwintering and feeding, then migrates up the Pearl and Pascagoula Rivers during the spring to summer holding grounds and for spawning (Heise et al. 2005). Since 1997, several research projects have posed hypotheses to better understand the freshwater and marine habitat requirements of the Gulf sturgeon in Mississippi, the genetic relationship of Gulf sturgeon among their distribution in the Gulf of Mexico, reproduction, and to estimate the population (Heise et al. 2004, 2005, Dugo et al. 2004, Heise et al. 2009, Ross et al. 2009). This research is on-going and has more urgency since hurricanes Ivan (2004) and Katrina (2005) made landfall because it is unknown what impact the hurricanes had on the population.

Movement from freshwater to saltwater of sub-adult and adult fish occurs from late September to December and movement from saltwater back to freshwater typically occurs from February to April. Far less is known about juveniles and young-of-the-year Gulf sturgeon and their migration timing; however, it is generally believed the young-of-the-year Gulf sturgeon travel downstream to the estuary in late January or February. First year Gulf sturgeon are thought to concentrate in the estuary to feed (NMFS and USFWS 2009).

Based on the research conducted prior to the hurricanes, it is likely that adult and sub-adult Gulf sturgeon occur in the study area and in the proposed project during winter months (Dugo et al. 2004, Heise et al. 2005, Ross et al. 2009). Juveniles are likely to occur in the nearshore area in Mississippi sound year round (Peterson et al. 2008). Ross et al. (2009) found that Gulf sturgeon use the water surrounding the barrier islands and the passes, but also found them in the near shore habitat (along the shoreline or within 3.1 miles of the shore). Ross et al. (2009) and Heise et al. (2005) conducted an extensive tagging and telemetry (tracking) study from 1997 to 2004 during which they followed individual fish throughout the Pascagoula and Pearl rivers, Mississippi Sound, as well as in Breton Sound. In Mississippi Sound, the majority of the tracking effort occurred near the barrier islands and was concentrated in the central and eastern portion of their study area. Ross et al. (2009) data indicates parallel movement does occur along the shoreline between the mouths of the Pascagoula and Pearl rivers. Furthermore, Dugo et al. (2004) showed that fish genetically assigned to the Pearl River are also caught in the Pascagoula River indicating lateral movement across the study area.

Gulf sturgeon spend their time feeding and searching for food while they overwinter in Mississippi Sound and fast during their stay in the freshwater environment, which makes them totally dependent on the marine/estuarine food web for growth (Gu et al. 2001). Heard et al. (2002) examined the stomach contents of one Gulf sturgeon that was found dead and the Florida lancelet (*Branchiostoma floridae*) was the sole organism that was identified. Later studies, as well as studies conducted in other parts of the Gulf confirm that Florida lancelets are one of the key prey items of Gulf sturgeon. However, Gulf sturgeon also eat various types of polychaetes (segmented worms), mollusks (including sand dollars and other bivalve shells), and other arthropods (NMFS and USFWS 2009).

Water quality is of concern to Gulf sturgeon critical habitat. Temperature, salinity, pH, hardness, turbidity, oxygen concentrations, and other chemical characteristics must be protected in order to preserved normal behavior, growth, and viability of all Gulf sturgeon life stages. The water quality characteristics or habitats where most sub-adult and adult Gulf sturgeon are located in Mississippi Sound are shown in Table 3.14-2 (Ross et al. 2009). Habitat characteristics that describe Gulf sturgeon winter habitat are relatively shallow water (less than 23 feet), which is well oxygenated and clear water located over sand and shell fragment substrate (Ross et al. 2009). If water quality is severely degraded, adverse impacts to Gulf sturgeon and its critical habitat may result. Water clarity in Mississippi Sound has historically been more turbid than that of the Gulf of Mexico due to various influences, such as the river emptying into the Sound, wave and wind energy, and commercial fishing activities.

The “sediment quality” primary constituent element (PCE) is listed to ensure sediment suitability (i.e., texture and other chemical characteristics) for normal behavior, growth, and viability of all life stages. Sediment quality is important because sediment type or quality is an indicator of benthic community. Gulf sturgeon depend upon benthic habitats that support abundant food items such as lancelets, sand dollars, haustoriid amphipods (bottom dwelling crustaceans), bivalve shells, and various types of segmented worms (polychaetes). These benthic communities are generally located within the silty and sandy sediment found in the Mississippi Sound area and near the barrier island

Table 3.14-2
Gulf Sturgeon Habitat Characteristics

Characteristic	Average	Minimum	Maximum
Dissolved oxygen (ppm)	7.5	4.7	9.2
Depth (feet)	12.8	3.9	22.9
Bottom Temperature (°F)	60.1	52.7	70.7
Salinity (ppt)	22.8	0	33.7
Dominant substrate	Mixture of fine to medium-sized sand	Mud and clay	Medium to coarse sand
Sub-dominant substrate	Medium to coarse sand	Mud and clay	Shell fragments

Source: Ross et al. (2009).

system. Sediment collected from the USACE Mobile District's 2010 sampling effort of the Bayou Casotte Channel (i.e., from the mouth southward to the "Y" junction) consisted of a mixture of sands, silts, and clays. The sandy material was found more at the northern end and reduced approaching the "Y" junction. Silts and clays were found throughout the channel. In Pascagoula Lower Sound, sediment consisted of mixture of sands, silts, and clays.

Although the information in this section focuses on Mississippi Sound, it is important to note that Gulf sturgeon travel long distances during the winter months. Fish that are genetically related to those in spawning grounds in Florida (Yellow and Choctawhatchee rivers) are found in Mississippi Sound and in the Pearl and Pascagoula Rivers (Dugo et al. 2004). The “migration habitat” PCE is concerned with ensuring safe unobstructed passage for the species. According to the Gulf Sturgeon 5-year review (NMFS and USFWS 2009) the most aggressive threats to the Gulf sturgeon population include channel improvements and maintenance dredging activities, water quality, contamination, red tide, climate change, and impeded river flow via dams or diversions.

The PCEs essential for the conservation of the Gulf sturgeon are those habitat components that support foraging, riverine spawning sites, normal flow regime, water quality, sediment quality, and safe unobstructed migratory pathways. The footprint of the proposed project is in units 2 and 8 of the Gulf sturgeon critical habitat. Bayou Casotte and Mississippi Sound system provides feeding, water quality, sediment quality, and migration habitat for Gulf sturgeon.

According to Ryan Hendren of NOAA in his response dated January 12, 2012, the Gulf Regional Biological Opinion (GRBO) will not cover activities of this project due to the fact that it will be widening the existing channel. The USACE will consult with the NMFS regarding impacts from the proposed dredging and placement of dredged material to Gulf sturgeon and Gulf sturgeon critical habitat. The NMFS will make the determination of whether a significant impact would result from the proposed project.

Alabama shad (*Alosa alabamae*)

The Alabama shad is federally listed as a species of concern (MMNS 2011, NMFS 2011c). An anadromous fish, it requires medium to large flowing rivers for spawning (NMFS 2011c, NatureServe 2010). Historically, the species ranged from the Suwannee River, Florida, to the Mississippi River, and is known to use the Tombigbee, Pearl and Pascagoula river drainages but is thought to be extirpated from all drainage basins except the Pascagoula River system (Ross 2001, Mickle et al. 2009). Ross (2001) also mentions that although this species has not been collected from coastal rivers it is likely that it uses some of the larger coastal streams. Little is known of their ecology in marine environments (Meadows et al. 2007). Although this species is thought to be extirpated from the Pearl River it is still found in Lake Pontchartrain, which is west of the project area, and in the Pascagoula River and utilizes Mississippi Sound to complete its life history. Juveniles enter the Gulf of Mexico in late summer to early winter (Meadows et al. 2007). Mickle (2010) reported juveniles spending the summer and fall in their natal drainage before returning to the Gulf of Mexico in late fall and winter. Sexually mature adults spawn spring / early summer over coarse sand and gravel with no foraging during spawning (Meadows et al. 2007). Additionally, the majority of the research completed to date in Mississippi has been conducted in the Pascagoula River and focuses on the freshwater phase of its life history (Mickle et al. 2009). The Alabama shad is likely to occur in the study area, but virtually no published data on marine habitat has been identified.

Dusky shark (*Carcharhinus obscurus*)

The dusky shark is a large shark with a wide-ranging distribution in warm-temperate and tropical continental waters. It is coastal and pelagic in its distribution where it occurs from the surf zone to well offshore and from the surface to depths of 1,300 feet (Compagno 1984, NMFS 2011d). Because it apparently avoids areas of lowest salinities, it is not commonly found in estuaries (Compagno 1984). The dusky shark is not likely to occur in the study area.

Sand tiger shark (*Carcharias taurus*)

Sand tiger sharks have a broad inshore distribution. In the western Atlantic, this shark occurs from the Gulf of Maine to Florida, in the northern Gulf of Mexico, in the Bahamas, and in Bermuda. A northern temperate region species, it is more common north of Cape Hatteras (Hoese and Moore 1998). They are generally coastal, usually being found in the surf zone down to depths around 75 feet. They may also be found in shallow bays around reefs, and to depths of 600 feet on the continental shelf. They usually live near the bottom, but may be found throughout the water column. Their biggest threat is overfishing (NMFS 2010b). Mississippi laboratories pelagic longline survey reported few captures (Carlson et al. 2009) and Grace and Henwood (1997) reported three captures south of Destin, Florida. Habitat for this species may exist in the study area, but percentage of encounters is low.

Speckled hind (*Epinephelus drummondhayi*)

The speckled hind inhabits warm, moderately deep waters from North Carolina to Cuba, including Bermuda, the Bahamas, and the Gulf. The preferred habitat is hard-bottom reefs in depths ranging from 150 to 300 feet, where the temperatures are from 60 to 85°F (NMFS 2009b). Habitat for this species does not exist in the study area.

Warsaw grouper (*Epinephelus nigritus*)

The Warsaw grouper is a very large fish found in the deepwater reefs of the southeastern U.S. This fish ranges from North Carolina to the Florida Keys and throughout much of the Caribbean and Gulf to the northern coast of South America. This species inhabits deepwater reefs on the continental shelf break in waters 350 to 650 feet deep (NMFS 2009c). Habitat for this species does not exist in the study area.

Opossum pipefish (*Microphis brachyurus lineatus*)

The opossum pipefish has been identified as a species of concern since 1991 (NMFS 2009a). This species has a widespread range, from New Jersey south through the Gulf of Mexico and Caribbean to Sao Paulo, Brazil, that spawns in low salinity areas of estuaries. Opossum pipefish are the only North American pipefish in which the males bear the brood pouch on the trunk rather than the tail. Maturation, mating and larval release occurs in freshwater during the wet season from June to November. Distribution in local stream systems appears to be very patchy and associated with clumps of emergent vegetation. Opossum pipefish are carnivorous, preying on crustaceans and small fish as ambush predators in dense vegetation.

Recent increases in the rate of destruction of important habitat and declines in water quality indicate that the remaining opossum pipefish populations are vulnerable. It is estimated that only a few hundred individuals still breed in tributaries in Southeast Florida. None have been collected in recent years from Mississippi (NMFS 2009a). The opossum pipefish is not likely to occur in the study area.

Scalloped Hammerhead Shark (*Sphyrna lewini*)

Scalloped hammerhead sharks are a very common coastal pelagic species that occur over shelves and deeper water, often entering bays and estuaries (Compagno 1984). They are found in inshore and offshore waters to depths of 902 feet, but have been seen at depths of 1,680 feet (Froese and Pauly 2011). Juvenile scalloped hammerhead sharks occur close to shore in bays, but will move to deeper waters as they grow. They prey mainly on a variety of fish and cephalopods (Compagno 1984). Mississippi Sound is a potential nursery area for this species (Bethea et al. 2008). Adult scalloped hammerhead sharks are present in the marine portions and juveniles are present in the estuarine and Gulf portions of the study area (NMFS 2006a, Bethea et al. 2008).

3.14.2 Terrestrial and Freshwater Threatened and Endangered Species

Based on a review of the USFWS's Endangered Species Database for Jackson County, Mississippi, the Information, Planning, and Conservation System (IPaC); and habitats in the study area, 13 species, shown in Table 3.14-3, have been identified that may be present landward of the Port of Pascagoula.

In addition, the MNHP maintains a current inventory of plants and animals protected at the state level. The database includes threatened and endangered species listed under the ESA, as amended (16 U.S.C. 1531 et seq.); the Mississippi State Nongame and Endangered Species Act; and additional rare species not listed officially (MNHP 2011).

While state-listed species and federally designated candidate species were considered during project planning and are addressed in this assessment, only those species identified by the USFWS and/or NMFS as threatened or endangered are afforded Federal protection under the ESA. Table 3.14-4 lists species with known habitat likely to occur in the study area.

Table 3.14-3
Freshwater and Terrestrial Federally and State-listed Species that may be Present within the Study Area

Common Name	Scientific Name	Federal Status	State Status
Plants			
Louisiana quillwort	*Isoetes louisianensis*	E	N/A
Amphibians and Reptiles			
Yellow-Blotched Map Turtle	*Graptemys flavimaculata*	T	E
Gopher Tortoise	*Gopherus polyphemus*	T	E
Alabama Red-Bellied Turtle	*Pseudemys alabamensis*	E	E
Black Pine Snake	*Pituophis melanoleucus*	C	E
Mississippi Gopher Frog	*Rana capito sevosa*	E	N/A
Mammals			
Louisiana Black Bear	*Ursus americanus luteolus*	T	E
Fish[1]			
Pearl Darter	*Percina aurora*	C	E
Birds			
Piping Plover	*Charadrius melodus*	T,CH	E
Mississippi Sandhill Crane	*Grus canadensis pulla*	E	E
Bald Eagle	*Haliaeetus leucocephalus*	BGEP	E
Brown Pelican	*Pelecanus occidentalis*	N/A	E
Red-Cockaded Woodpecker	*Picoides borealis*	E	E

T – Threatened; **E** – Endangered; **C** – Candidate; **CH** – Critical habitat
BGEP – Bald and Golden Eagle Protection Act

1 The Gulf sturgeon is listed by the USFWS as threatened and listed in Table 3.14-2. The USFWS and the National Marine Fisheries Service share jurisdictional purview over this species and its designated critical habitat. Most of the study area is within the NMFS jurisdiction for this species.

Table 3.14-4
USFWS and State-listed Species (Freshwater and Terrestrial), Known Habitat, and Likelihood of Occurrence within the Study Area

Common Name	Habitat	Likely to Occur in the Study Area?
Plants		
Louisiana quillwort	Riparian Bottom Wetlands	Yes
Amphibians and Reptiles		
Yellow-Blotched Map Turtle	Streams with strong currents	Yes
Gopher Tortoise	Well drained habitats with sandy soils	Yes
Alabama Red-Bellied Turtle	Shallow-water habitats with dense aquatic vegetation	Yes
Black Pine Snake	Longleaf pine habitat	No
Mississippi Gopher Frog	Well drained soils with temporary pools	Yes
Mammals		
Louisiana Black Bear	Bottomland hardwood forests	Yes
Fish[1]		
Pearl Darter	Upstream Pascagoula river	No
Birds		
Piping Plover	Coastal habitats	Yes
Mississippi Sandhill Crane	Various wetland habitats	Yes
Bald Eagle	Various habitats near water bodies	Yes
Brown Pelican	Coastal habitats	Yes
Red-Cockaded Woodpecker	Longleaf pine	No

1 The Gulf sturgeon is listed by the USFWS as threatened and listed in Table 3.14-2. The USFWS and the National Marine Fisheries Service share jurisdictional purview over this species and its designated critical habitat. Most of the study area is within the NMFS jurisdiction for this species.

3.14.2.1 Plant Species

There is one federally listed plant species that potentially occurs within the study area. The Louisiana quillwort is listed as endangered and was added to the ESA in 1992. The state has no regulations concerning endangered plants. The quillwort is an emergent aquatic plant species that typically occurs in wetland habitat described as riparian bottomlands with a canopy of hardwood (MMNS 2001). The plant is grass like and reproduces via spores and not seeds (MMNS 2001). Leaf length appears to be dependent upon water depth and varies in length from 5.9 to 15.7 inches long. This species has been documented to occur in Jackson County, although the documented range is in the northwest of the county outside of the study area.

3.14.2.2 Animal Species

3.14.2.2.1 Amphibians and Reptiles

Yellow-Blotched Map Turtle

The yellow-blotched map turtle (*Graptemys flavimaculata*) is federally listed as threatened and state-listed as endangered. This species exhibits sexual dimorphism with females larger than males. The species is a medium sized turtle with yellow to orange blotches on its costal and vertebral scutes. The carapace of the turtle has conspicuous black spine-like projections (MMNS 2001). This species has specific habitat requirements that include streams with strong currents. The turtle tends to avoid small creeks that are shaded by bank vegetation (USFWS 1993). The species is limited in range to the Pascagoula River and its larger tributaries. A portion of the turtles range is within the study area.

Gopher Tortoise

The gopher tortoise (*Gopherus polyphemus*) is federally listed as threatened and state listed as endangered. The tortoise is indigenous to dry, drained, sandy habitats throughout the coastal plain. In Mississippi, the gopher tortoise has been documented in Jackson County. The gopher tortoise is a large terrestrial turtle with characteristic spade-like front limbs, used for digging, and elephantine hind limbs (MMNS 2001). Similar to the black pine snake, this species inhabits well-drained to excessively well drained habitats that allow the tortoise to burrow under the soil surface. Habitats conducive to supporting tortoise populations include longleaf pine and scrub oak habitats (MMNS 2001). The tortoise may be present in the study area in areas of well-drained soils, but the majority of the study area is comprised of open-water areas that would not be utilized by this species.

Alabama Red-Bellied Turtle

The Alabama red-bellied turtle (*Pseudemys alabamensis*) was listed as endangered by the USFWS in 1987. The turtle is listed as endangered by the state. This species is a large basking turtle with yellow stripes on the limbs, neck, and head (MMNS 2001). Individuals of this species found in Mississippi typically have fewer or less conspicuous head stripes and have a narrower head than individuals of this species found in Alabama (MMNS 2001). This species uses dense beds of aquatic vegetation for basking and is known to nest in sandy areas along natural riverbank levees. The turtle has been documented in Jackson County with sightings of adults and hatchlings on Horn Island which is located within the study area of this project.

Black Pine Snake

The black pine snake (*Pituophis melanoleucus*) is a currently a candidate for Federal listing. This species is listed by the state as endangered. The species occurrence has been mapped by the USFWS in Jackson County. This is a large species that prefers longleaf pine habitat (MMNS 2001). The longleaf pine habitat is characterized by well-drained sandy soils with an open canopy of mature longleaf pines. Black pine snakes are opportunistic feeders, with small birds and rodents making up major prey species. Surveys and trapping indicate that it has been extirpated from Louisiana and four counties in Mississippi with extant populations concentrated in the DeSoto National Forest (MMNS 2001). Although found within Jackson County the documented occurrences are in the northwest portion of the county, outside of the study area.

Mississippi Gopher Frog

The Mississippi gopher frog (*Rana capito sevosa*) is federally and state listed as endangered. This species is a medium-sized frog with the back marked with large brown spots (MMNS 2001). The frog's range includes Jackson County. The frog needs temporary pools, where they breed, and upland foraging sites within its habitat. This species is strongly associated with the gopher tortoise whose burrows are used by the frog as refugia (MMNS 2001). The species may be present within the study area in habitats with well-drained soils and temporary pools, but the majority of the study area is comprised of open-water areas that would not support this species.

3.14.2.2.2 Mammals

Black Bear

The Louisiana black bear (*Ursus americanus luteolus*) is listed federally as threatened and state listed as endangered. The black bear is a large, stocky bear with a short tail. Adults bears can range in size from 4.5 to 6.25 feet in length and can weigh from 198 to 400 pounds (MMNS 2001). Louisiana black bears typically inhabit bottomland hardwood forests, but may also use other habitat types, especially when food is available. Black bears are opportunistic omnivores having the ability to feed on a number of prey depending on availability (USFWS 1995). Bottomland hardwood forests feature the food sources and denning sites that are necessary for successful bear reproduction. Remaining bear habitat has been fragmented and degraded; degraded habitats often do not provide sufficient food for bears. As bears travel in search of food, they are more likely to come into conflict with humans. Human-related mortality of the Louisiana black bear is thought to pose a direct threat to the population. The historic range of the bear included Jackson County and portions of the study area. Bear sightings have been reported in the Grand Bay National Wildlife Refuge, approximately 15 miles northeast of the project area and four black bears have been captured and tagged in the last few years in Jackson County according to Brad Young, Black Bear Program Leader, MDWFP (personal communication, February 16, 2012). All four bears were located north of Interstate 10 and he was not aware of any reported sightings of black bears in or around the city of Pascagoula.

West Indian Manatee

The West Indian manatee is a federally and state-listed endangered aquatic mammal (MMNS 2011, MNHP 2011, USFWS 2010). It is also protected under the Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. Chapter 31 as amended). It inhabits marine, estuarine, and freshwater environments, preferring large, slow-moving rivers, river mouths, and shallow coastal areas such as coves and bays (Lefebvre et al. 1989, USFWS 2011c). Manatees are opportunistic herbivores, feeding on a wide variety of submerged, floating and emergent marine, estuarine, and freshwater plants (O'Shea and Ludlow 1992). The manatee is more common in the warmer waters off of coastal Mexico, the West Indies, and Caribbean to northern South America (NatureServe 2010). Outside of Florida, manatees are mainly migratory species during the warmer months and sightings in Mississippi have increased (O'Shea and Ludlow 1992, Mississippi-Alabama Sea Grant Consortium n.d.). During summer months, manatees may migrate as far north as coastal Virginia on the east coast and the Louisiana coast on the Gulf of Mexico. Manatees are known to migrate through the study area, and in May 2011, two fishermen reported hooking a manatee around the Katrina reef near Deer Island, just off the Mississippi coast (Raines 2011). According to USFWS (2011c), the manatee may potentially occur in coastal waters off of Jackson County, Mississippi. MMNS (2011) documents manatee only occurring in coastal waters off of Harrison County.

3.14.2.2.3 Freshwater Fish

Pearl Darter

The pearl darter (*Percina aurora*) is a candidate species for listing under the ESA and is listed as endangered under state regulations. This small fish is olive to light brown in color. The name of the fish is taken from the conspicuous pearly, pastel blue coloration prominent on the sides and lower portion of the head (MMNS 2001). The fish is known to occur in the Pascagoula River upstream and not within the study area.

3.14.2.2.4 Birds

Piping Plover

The piping plover (*Charadrius melodus*) is listed federally as threatened and listed by the state as endangered. This plover is a shorebird having a pale, sandy-colored upper body with orange legs (MMNS 2001). Piping plovers may nest singly or in loose colonies of the same species or with other shorebirds. Adults usually leave the breeding ground by early August with juveniles remaining at the breeding grounds for a few weeks longer (MMNS 2001). The piping plover is a permanent resident of the dune complexes of the coastline and barrier islands within the study area. The USFWS has designated the Gulf of Mexico coastline, Horn Island, Petit Bois Island, and Round Island as critical habitat for the wintering piping plovers. Horn Island and Petit Bois Island are within the Mississippi critical habitat Unit 14. Round Island is within the Mississippi critical habitat Unit 13.

Mississippi Sandhill Crane

The Mississippi sandhill crane is listed federally and by the state as endangered. The Mississippi sandhill crane is a large bird standing 3 to 4 feet tall with a wingspan of up to 8 feet when fully grown. This species can be found in open savannas, swamp edges, young pine plantations, wetlands along edges of pine forests, bayheads and swamps (MMNS 2001). Nests of this species are constructed on the ground in wetlands. Nesting sites are characterized by open areas of grasses and sedges with perennial shallow water (USFWS 1991). Sandhill cranes feed on insects, seeds, roots, fruits, and nuts. Critical habitat for this species has been designated in southern Jackson County, extending from the Pascagoula River west to the Jackson County line. There is no critical habitat located within the study area.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is protected at the Federal level by the Bald and Golden Eagle Protection Act (BGEPA). The bald eagle is listed as endangered by the state. Under BGEPA, bald eagle nests are protected through the implementation of a 660-foot zone extending outward from the nest tree. Currently the requirements do not allow construction activities within the zero- to 330-foot buffer of any active nests during the nesting season (October 1 to May 15). Construction between the 330-foot and 660-foot buffer will either occur outside of nesting season or a qualified biologist will monitor the nest if construction activity occurs during the nesting season. The bald eagle is a large bird with a wingspan of 70 to 90 inches (MMNS 2001). Adult eagles are easily identifiable by their white heads and yellow talons. The bald eagle typically resides near bodies of water such as streams, lakes, rivers, or sea coasts which are used as foraging areas. Bald eagle nesting sites have been documented on Horn Island within the study area (GEMS 2011).

Brown Pelican

The brown pelican (*Pelecanus occidentalis*) has been delisted from the ESA. At the state level the brown pelican is listed as endangered. The brown pelican is a conspicuous large bird with distinctive features. Adult brown pelicans can achieve wing spans of 7.5 feet (MMNS 2001). Brown pelicans are colonial birds forming colonies of between 25 to 250 individuals. The primary diet of the species is fish. Pelicans occur through a wide range of coastal habitats and although it does not nest in Mississippi it is found throughout the state's coastal areas. The brown pelican is found roosting and foraging within the study area.

Red-Cockaded Woodpecker

The red-cockaded woodpecker (*Picoides borealis*) is federally and state listed as endangered. The red-cockaded woodpecker is a small woodpecker distinguished by black coloring at the top of the head and back of the neck. Adult males have a few red feathers behind and above the eye (MMNS 2001). The red feathers are a distinguishing mark that gives this species its name. This species has unique habitat requirements nesting and roosting in cavities within live pine trees. Its preferred habitat is open pine woodlands and savannahs with large old pines (USFWS 2003). The preferred species of pine appears to be the longleaf pine (*Pinus palustris*). Red-cockaded woodpecker cavities are distinctive as the woodpecker creates several resin wells that allow sap to cover the trunk of the nest tree. This sap affords protection of the cavity nest from predators. Red-cockaded woodpeckers live in family groups that typically consist of a breeding pair and one or two helpers (USFWS 2003). This species is non-migratory and a permanent resident and individuals are known to inhabit areas of Jackson County. Red-cockaded habitat does not occur within the barrier island portions of the study area. Known red-cockaded woodpecker habitat in Jackson County is largely out of the study area.

3.15 CLIMATE CHANGE/ SEA LEVEL RISE

3.15.1 Historic Sea Level Rise

Sea level in the Gulf of Mexico is rising and is projected to continue rising at an accelerated rate compared to historic rates. The tide station nearest the proposed project for which the rate of sea level rise has been calculated by NOAA's Center for Operational Oceanographic Products and Services (CO-OPS) program, is located at Dauphin Island, Alabama. The historic relative sea level rise at Dauphin Island is 2.98 mm/year (Figure 3.15-1) and represents a consideration in the development of future sea level rise scenarios (USACE 2011h).

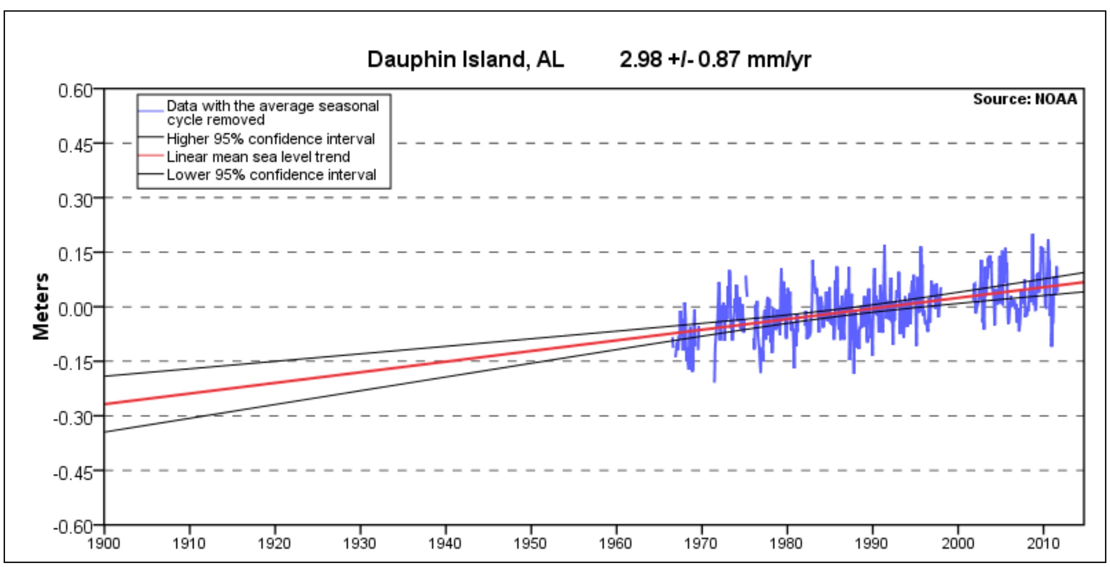


Figure 3.15-1. Sea Level Rise Recorded at Dauphin Island, Alabama
(Station 8735180) (Source, NOAA)

3.15.2 Tide Characteristics

Tidal characteristics at the Port of Pascagoula and neighboring Pascagoula NOAA Lab are microtidal (i.e., less than 2 meters) (Table 3.15-1). Great diurnal range, or difference in height between mean higher high water and mean lower low water, is 1.56 feet at the Port of Pascagoula, Dock E (tide station 8741041) and 1.54 feet at the Pascagoula NOAA Lab (tide station 8741533). The mean range of tide, or the difference in height between mean high water and mean low water, is 1.38 feet and 1.35 feet at the respective tide stations.

Table 3.15-1
Tidal Characteristics for Port of Pascagoula and Pascagoula NOAA Lab

Station	Dock E, Port of Pascagoula, MS Station ID: 8741041	Pascagoula NOAA Lab, MS Station ID: 8741533
Latitude	30° 20.8' N	30° 22.0' N
Longitude	88° 30.3' W	88° 33.7' W
Great Diurnal Range (GT)	1.56 feet	1.54 feet
Mean Range of Tide (MN)	1.38 feet	1.35 feet
Date Station was Established	Jan 22 2008	Sept 13 2005

3.15.3 Present Climate

Climatic parameters important to discussion of climate change in the region include precipitation, temperature, and tropical cyclones. Precipitation and temperature data reported in this section were obtained from the Southeast Regional Climate Center (SRCC), Station: 226718, Pascagoula 3 NE.

Precipitation

Over the period from 1909 to 2010, the average annual rainfall at Pascagoula is 62.7 inches (SRCC 2011). Precipitation is fairly evenly distributed throughout the seasons with a slight increase in the summer months (Figure 3.15-2).

Temperature

The monthly temperature distribution for Pascagoula over the period from 1909–2010 is presented in Figure 3.15-3 (SRCC 2011).

Hurricanes

The Mississippi Gulf Coast region is subject to tropical cyclones and several hurricanes have passed within 30 kilometers of Pascagoula since 1900 (Table 3.15-2).

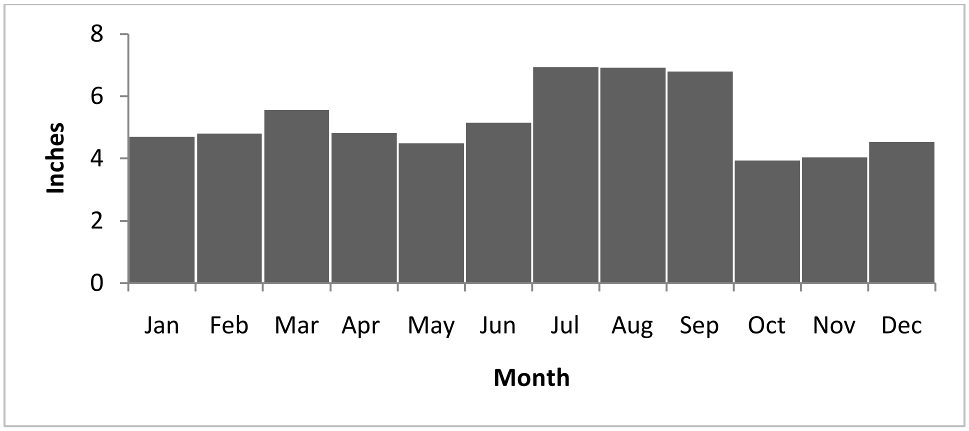


Figure 3.15-2. Average Monthly Precipitation, Pascagoula, Mississippi
(Station: 226718 Pascagoula 3 NE) (Source: SRCC 2011)

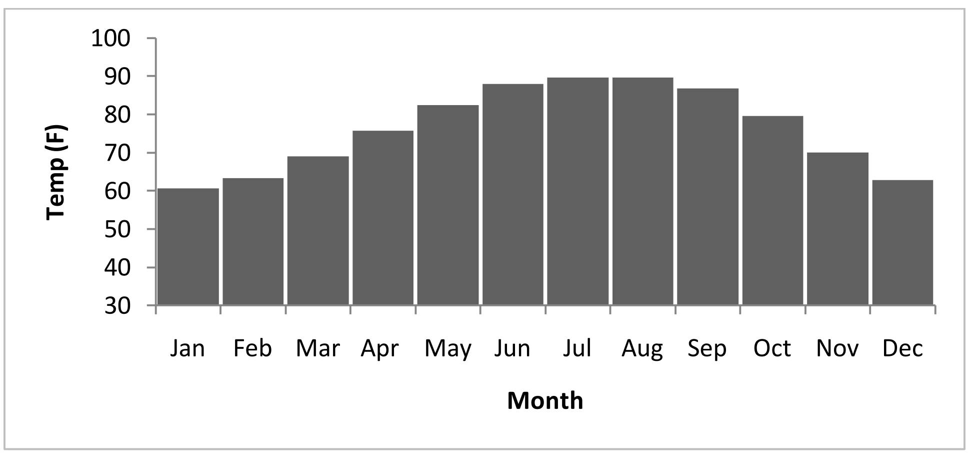


Figure 3.15-3. Average Monthly Temperature, Pascagoula, Mississippi
(Station: 226718 Pascagoula 3 NE) (Source: SRCC 2011)

Table 3.15-2
Hurricanes Passing Within 30 Kilometers of Pascagoula, Mississippi, Since 1900
Source: NOAA, 2011

Storm Name	Date	Max Saffir-Simpson
Georges 1998	Sept. 15, 1998 to Oct. 1, 1998	H5
Elena 1985	Aug. 28, 1985 to Sept. 4, 1985	H3
Frederic 1979	Aug. 29, 1979 to Sept. 15, 1979	H4
Not named 1932	Aug. 26, 1932 to Sept. 4, 1932	H1
Not named 1926	Sept. 11, 1926 to Sept. 22, 1926	H4
Not named 1916	Jun. 28, 1916 to Jul. 10, 1916	H3
Not named 1912	Sept. 10, 1912 to Sept. 15, 1912	H1
Not named 1911	Aug. 8, 1911 to Aug. 14, 1911	H1
Not named 1906	Sept. 19, 1906 to Sept. 30, 1906	H3
Not named 1901	Aug. 2, 1901 to Aug. 18, 1901	H1

3.15.4 Greenhouse Gas Emissions and Carbon Sequestration

Carbon sequestration in the study area is concentrated in “blue” carbon sites. Blue carbon is a term describing carbon captured by Earth’s oceans and marine ecosystems. The blue carbon sinks in the study area include salt marshes and seagrasses. These act as carbon sinks in their present state and may release stored carbon if disturbed or converted to other uses. Figure 3.11-1 and 3.11-2 show locations of wetlands and seagrasses, respectively.

Salt marshes store carbon in anaerobic sediments, thereby inhibiting the oxidation of organic matter and release of carbon dioxide to the atmosphere. As the sediments beneath salt marshes accumulate, and remain anaerobic, the total amount of carbon stored in them increases over time. Salt marshes are especially effective in sequestering carbon compared to freshwater wetlands because formation of the potent greenhouse gas, methane, is inhibited in the saline environment of the salt marsh. Salt marshes may keep pace with sea level rise if conditions are favorable for sediment accretion (i.e., maintenance of healthy vegetation cover and adequate sediment supply).

Along the Gulf Coast, seagrass meadows form important carbon sinks. Seagrass meadows form extensive, long-lasting root structures that provide the majority of their carbon storage capacity. Smaller carbon storage potential is provided by above ground biomass. Disturbance of seagrass meadows may reduce the rate of carbon sequestration, or if the disturbance is more severe, lead to a conversion of stored carbon to carbon dioxide released to the atmosphere.

The combustion of fuel in highway and off-road vehicles, locomotives, and ocean-going vessels, will result in an increase in Greenhouse Gas (GHG) emissions that could contribute to global climate change. To date, specific thresholds to evaluate adverse impacts pertaining to GHG emissions have not been established by local decision-making agencies, the state, or the Federal government. The Council on Environmental Quality has published "Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions," February 18, 2010 (CEQ 2011). The Draft Guidance suggests that the impacts of projects directly emitting GHGs in excess of 22,676 tons or more of carbon dioxide-equivalent GHG emissions on an annual basis be considered in a qualitative and quantitative manner. However, the guidance stresses that, given the nature of GHGs and their persistence in the atmosphere, climate change impacts should be considered on a cumulative level.

3.16 CULTURAL RESOURCES

Cultural resources are prehistoric and historic archaeological sites, districts, structures, or locations considered significant to a culture, a subculture, or a community for scientific, traditional, religious, or other reasons. Prehistoric archaeological resources may include rock shelters, lithic scatters, flaked stone scatters, rock rings or alignments, tool procurement sites, thermal features/roasting pits with artifact scatters, and rock art locations. Historic sites may include buildings, structures, features such as mine shafts, transportation routes, and refuse deposits.

Legislative mandates, including but not limited to Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470 et seq. in compliance with 36 C.F.R. 800), the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321–4347) and the Archaeological Resources Protection Act (ARPA) of 1979, as amended (16 U.S.C. 470aa–mm) require Federal agencies to assess potential effects Federal actions may have on districts, sites, buildings, structures, or objects included, or eligible to be included, in the National Register of Historic Places (NRHP).

To be eligible for NRHP listing, an archaeological site or other property must satisfy at least one of the National Register criteria as set forth in 36 C.F.R. 60.4. The site or property must possess integrity of location, design, setting, materials, workmanship, feeling, and association as well as:

- Be associated with events that have made a significant contribution to the broad patterns of our history; or
- Be associated with the lives of persons significant in our past; or
- Embody the distinctive characteristics of a type, period, or method of construction, or a significant and distinguishable entity whose components may lack individual distinction; or
- Have yielded, or may be likely to yield, information in prehistory or history.

3.16.1 Previous Investigations

Bayou Casotte and the Pascagoula Lower Sound channels of the Pascagoula Harbor Channel are in the Coastal Pine Meadows archaeological region, which includes the southernmost portions of

Jackson and Harrison counties, the southern and western portion of Hancock County, and the westernmost portion of Pearl River County. This region is unique because of its cultures' coastal adaptations to focus on marine and estuarine resources and has been continuously occupied since prehistoric times. As such, numerous studies have been undertaken in the study area to determine the effect of proposed projects on cultural resources.

One of the earlier investigations of the area was undertaken in 1983 by OSM Archaeological Consultants, Inc. A cultural resources reconnaissance of Pascagoula Harbor (both terrestrial and marine) was conducted in order to "provide a baseline study of the prehistoric and historic human use and occupation of this southeast Mississippi locale." The study resulted in the relocation or attempted relocation of six previously recorded archaeological sites (22JA516, 22JA618, 22JA537, 22JA522, 22JA523, and 22JA592) as well as the recording of three historic sites that were not assigned trinomials by the MDAH due to their recent age. The results of the findings as it pertains to shipwrecks are discussed in subsection 3.16.2 (Mistovich et al. 1983).

In 2005, Gulf LNG Energy, LLC, proposed to site, construct, and operate an LNG terminal adjacent to Bayou Casotte Harbor. Site 22JK674 and a historic district in downtown Pascagoula were the nearest archaeological site and architectural properties identified, respectively. In consultation with the Federal Energy Regulatory Commission (FERC) and the MDAH, it was concluded that the proposed project would not affect any properties listed or eligible for listing in the NRHP (FERC 2006).

Studies were also undertaken for the USACE Mobile District's proposed construction of authorized improvements to the Pascagoula Harbor Navigation Channel. Although numerous shipwrecks occurred along the Gulf shoreline, no NRHP-designated sites were identified within their project study area. While two historic shipwrecks (*Jerry Ann and Gee Bee*) were identified near the project area, neither shipwreck was listed in the NRHP. Three additional shipwrecks were identified as being in the vicinity of the proposed Area of Potential Effect (APE), including two (*Angler and Arcturus*) west of the LZA south of Horn Island and one (*Wanda Four*) near the LZA. Because the resources identified were not within the proposed APE, it was concluded that none of the resources would be affected by the proposed project (USACE 2010).

The USACE Mobile District also conducted studies relating to proposed improvements to the Pascagoula Harbor's Lower Pascagoula and Bayou Casotte Channels. According to the USACE Mobile District, "a number of prehistoric archaeological sites and historic archaeological sites have been recorded along the bayou. These include the Big and Little Greenwood Island sites (22JA516 and 22JA618) and a post-Mexican War hospital and cemetery associated with Camp Jefferson Davis." These sites were studied during a 1982 terrestrial survey and archaeological testing of the proposed Bayou Casotte Port. The following year, a terrestrial and marine survey of Pascagoula Harbor and the Pascagoula Harbor Navigation Channel was conducted in which the sites were discussed further (see Mistovich et al. 1983). It was recommended that the remaining burials be located, removed and reinterred along with minimal mitigation of the two archaeological sites. Additionally, the USACE Mobile District's "review of the previous studies and other data available identified no historic shipwrecks or anomalies suggestive of historic wrecks in Bayou Casotte" (USACE n.d.).

3.16.2 Results of the Records Review

Atkins conducted research of available records using the MDAH's Mississippi Historic Resources Inventory Database (MHRID) to identify properties, Mississippi Landmarks, NRHP-listed properties and districts, and local designations. As a secondary source of NRHP-listed properties, the National Park Service's (NPS) NRHP GIS Spatial Data was consulted. Additionally, the NPS's National Historic Landmarks (NHL) program was also reviewed. The results of the records and literature review as it pertains to shipwrecks are discussed below.

Approximately 1 Mississippi Landmark, 30 NRHP-listed properties (6 are non-extant), 3 NRHP-listed districts, 1 NRHP-listed property and National Historical Site, and 4 NRHP-listed properties and Mississippi Landmarks were identified as being within the current study area. Additionally, the MRHID identified 825 properties (182 are non-extant) within Jackson County and of these, 335 are in Pascagoula.

Jackson County is one of six counties within the Mississippi Gulf Coast Natural Heritage Region. According to the Mississippi Gulf Coast National Heritage Area Management Plan, based on an inventory mostly conducted prior to Hurricane Katrina, Jackson County contained 12 NRHP Historic Districts and Multiple Resource Areas (4 of these are in Pascagoula), 61 NRHP Historic and Pre-Historic Sites (of these, 35 are in Pascagoula), 9 Mississippi Landmarks (4 of these are in Pascagoula), 238 previously recorded archaeological sites (of which 138 have an unknown/ unevaluated eligibility for listing in the NRHP, 33 are eligible for listing in the NRHP, 4 are listed in the NRHP, and 63 are ineligible for listing), and 736 standing structures (MDMR 2005).

The analysis for this EIS was based on correspondence for the proposed project received from the USACE Mobile District (see Appendix D). No updates or additional reviews of previously recorded archaeological sites were conducted. Correspondence between the USACE Mobile District and the MDAH indicates that "the currently, proposed expansion of the Bayou Casotte and the Lower PHNC includes areas previously surveyed, but not considered within the dredging project APE. The proposed expanded APE includes several archaeological sites, including the Big and Little Greenwood Island sites (22JA516 and 22JA618) and a post-Mexican War hospital and cemetery associated with Camp Jefferson Davis (Bradley 2011)." Additionally, the MDAH noted that the University of Southern Mississippi had recently done work on Greenwood Island and they had received "a significant collection from Greenwood Island in the last 2 years" (Williamson 2011a).

Recent attempts to relocate 22JA618 have failed. The site has likely completely eroded or has been covered with dredge spoil. The USACE Mobile District recently conducted limited Phase II testing at site 22JA516 (Bradley 2011, Williamson 2011b). In fall 2011, limited Phase II testing of site 22JA516 was conducted by Brockington and Associates, Inc., on behalf of the USACE Mobile District for the Preferred Alternative. During the excavation, a substantial area of intact and partially intact prehistoric midden was identified and the USACE Mobile District concluded the site to be eligible for inclusion in the NRHP under Criterion D for its potential to produce important information regarding local and regional prehistoric occupation, including information pertaining to prehistoric cultural chronology, subsistence patterns, intrasite use and mortuary practices (RabbySmith 2012).

Most recently, Earth Search, Inc., conducted a remote-sensing survey and subsurface probing of the Mexican War-era graveyard associated with Camp Jefferson Davis. Prior to their investigation, seven to nine graves were believed to be present in the cemetery, of which six had been previously identified and removed. During the current investigation's probing, a single submerged coffin was identified. The coffin was believed to be associated with one of the previously excavated burials in which during the excavation, the coffins were left in situ. Although the number of graves originally interred at the cemetery is unclear, based on the results of the current survey, Earth Search believed no other intact coffins remained in their project area and recommended no further work (Rawls and RabbySmith 2012).

Shipwrecks

Coastal Mississippi has a rich maritime history spanning more than 300 years. Possible shipwrecks in the project area could include sailing vessels employed in the exploration and colonization of the Mississippi Coast by the French during the turn of the eighteenth century to today's modern pleasure and fishing craft. Probability studies conducted for the Bureau of Ocean Energy Management, Regulation, and Enforcement (previously the Minerals Management Service) (Garrison et al. 1989, Pearson et al. 2003) indicate that there were few shipwrecks in the Gulf prior to 1750. That number remained low until the last quarter of the nineteenth century, a period that reflects the growth of the major commercial cities along the rim of the Gulf and the heyday of steam power. Vessel losses continued to increase into the twentieth century but expanded dramatically after 1950. That increase is correlated with the rise in the use of pleasure craft and vessels engaged in fishing, both commercial and private.

In addition to Garrison et al. (1989) and Pearson et al. (2003), at least three other comprehensive studies have been conducted to determine the potential for shipwreck resources in the vicinity of Pascagoula Harbor, Horn Island, and Petit Bois Island. The first was performed by Mistovich et al. (1983) of OMS Archaeological Consultants, Inc., and inventoried roughly 72 shipwrecks believed to be submerged within a study area roughly bound by Bellefontaine Point, Horn Island, Petit Bois Pass, and Lowry Island. An additional 46 shipwrecks were identified, but later "disqualified" from the main inventory. Magnetic anomalies revealed six submerged sites, including the Horn Island Lighthouse and the yacht *Frejabar IV*. While the 1983 survey was largely oriented towards the Mississippi Sound and the approaches to Pascagoula Harbor, a second study performed by

Mistovich et al. (1990) covered 9 miles of the existing Pascagoula channel to a point 4 miles above its confluence with the Escatawpa River. At least 18 vessel losses were recorded within their study area (Mistovich et al. 1990).

The third study was conducted by Pearson and Forsyth (2006). This study was performed to develop protocols for the USCG for protecting historic shipwrecks during debris removal operations after Hurricane Katrina. The area of concern stretched along the entire Mississippi coastline and extended 4 miles off the coast. Data collected were compiled into a GIS database. This research identified a total of 52 locations as known or potential historic shipwrecks. An examination of the data indicates that 2 of the 52 known or potential shipwrecks are located in the current study area.

Additional review of the Office of Coast Survey's Automated Wreck and Obstruction Information System (AWOIS) database identified approximately 33 shipwrecks and 35 submerged resources/ objects in the study area. According to the preliminary draft of the Feasibility Scoping Meeting Report, Bayou Casotte Harbor Channel Improvement Project, a "review of the previous studies and other data available identified no historic shipwrecks or anomalies suggestive of historic wrecks in Bayou Casotte (USACE 2011a)." However, a study undertaken for the USACE Mobile District's proposed construction of authorized improvements to the Pascagoula Harbor Navigation Channel (USACE 2010) and the AWOIS database show the *Sea Bee* in the vicinity of the proposed project.

The fishing vessel *Sea Bee* was included in Local Notice to Mariners 42-80 (the 42nd report for the year 1980, 3rd week of October) stating that "the 38-foot fishing vessel *Sea Bee* previously reported sunk in approximate position 30 –18.2N, 88 –30.5W with 2 feet of the vessel showing above the water has been salvaged. Portions of the vessel have been reported in an area 300 feet northeast of Bayou Casotte Light 8." NOAA Chart 11375, published on November 5, 1983, indicates an obstruction in the reported vicinity of the *Sea Bee* that was not present when the chart was published on July 12, 1980. This would indicate the obstruction on the chart was plotted after July 1980, which is in line with the October 1980 salvage of the *Sea Bee* as indicated in the referenced notice to mariners.

Background information indicates that the *Sea Bee* is a modern vessel, which sank in 1980 and has been partially salvaged. As such, the *Sea Bee* would not meet the minimum requirements for inclusion in the NRHP, and no further investigation would be warranted (Grunewald 2012a).

3.17 LAND USE

This section presents the various land uses and land covers that may be impacted by the proposed project, as well as utilities, public safety, transportation, and parks, recreation, and other community facilities. As described previously, the Port of Pascagoula is located approximately 10 miles south of IH 10, encompasses approximately 214 acres, and is bound to the north by U.S. 90, to the east by MS 63, and to the west by Pascagoula Bay.

The Port is zoned for industrial and special uses and contains two harbors: the Bayou Casotte Harbor and the Pascagoula River Harbor. There are rail service terminals at both of the harbors, and cargo is distributed from the Port via rail and trucking services.

The Port, which is operated by the JCPA, contains nine deepwater berths (five in the Pascagoula River Harbor and four in the Bayou Casotte Harbor) and one barge berth, and owns and operates public cargo facilities in the Pascagoula River Harbor and Bayou Casotte Harbor. The Port is public, though most facilities are operated through leases, operating agreements, or space assignment agreements with private operators or users.

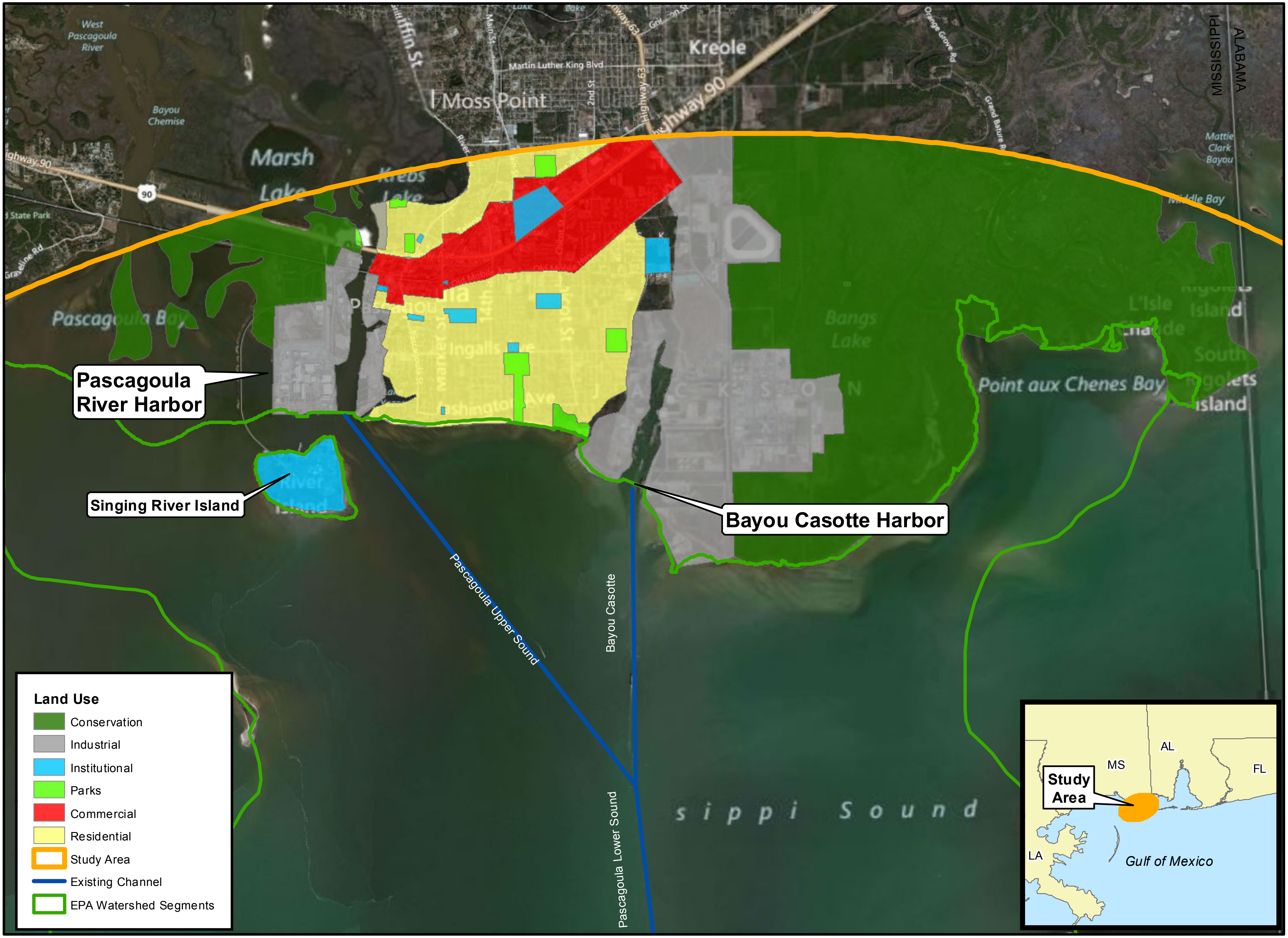
The Port of Pascagoula is zoned industrial and is located on a peninsula surrounded on the west and the south by the Pascagoula Channel. The eastern boundary of the Port is adjacent to the City of Pascagoula, which includes both residential and commercial land use (Figure 3.17-1, City of Pascagoula 2006). The city's retail and commercial land uses are aligned along U.S. 90, with residential communities which support commercial, public and private recreational uses extending south to Beach Boulevard and Mississippi Sound. These residential land uses adjoin the industrial port facilities at Bayou Casotte to the east. Hurricane Katrina damaged residential and commercial areas, and rebuilding and repair efforts are for the most part completed. These zoning districts include industrial, commercial, and residential areas.

Utilities

The City of Pascagoula and the Port of Pascagoula are served by Mississippi Power Company and Singing River Electric Power Association for electricity, Pascagoula Utilities Department for natural gas and sanitary sewer collection, the Port of Pascagoula for water, Jackson County Utility Authority for (JCUA) for waste water treatment services, and BellSouth for telephone service (City of Pascagoula 2011a).

Transportation

Although there are smaller airports throughout coastal Mississippi, the Gulfport-Biloxi International Airport is the only passenger airport accepting major commercial airlines. Trent Lott International Airport is a county-owned, public-use airport located 6 miles north of Pascagoula. Trent Lott International Airport is used for charter companies, flight training, and accommodates flight testing facilities for manned and unmanned airplanes and helicopters. Additionally, the airport is used by corporate clients including Ingalls Shipbuilding, Chevron, Omega Protein, and ERA Helicopters (Jackson County 2012).



US Army Corps of Engineers Mobile District

Figure 3.17-1

Land Uses in the Study Area

The Port of Pascagoula is served by CSX Transportation with access to the Canadian National Railroad via the shortline carrier Mississippi Export Railroad (Port of Pascagoula 2012). CSX is a Class I railroad serving the developed portion of the Mississippi Coastal Area. Its main lines traverse most of the region's municipalities. The CSX track has an east-west orientation and serves as a major connection between the deepwater ports in New Orleans and Mobile (CSX 2010). The Mississippi Export Railroad is a Class III 42-mile short-line railroad extending from Pascagoula to Evanston, Mississippi. It is the north-south corridor connecting the Canadian National Railroad and the east-west line of CSC Transportation. Rail service to the Port of Pascagoula is provided by CSX Transportation and Mississippi Export Railroad (Mississippi Export Railroad 2012).

Trucking services use IH 10 and U.S. 90. IH 10 is located approximately 8 miles north of the Port and U.S.90 is located approximately 3.5 miles north of the Port. Arterial roads connecting the Port to IH 10 and U.S.90 include MS 611/63 as well as Shipyard Expressway (Bayou Casotte Parkway). Annual average daily traffic (AADT) counts on MS 611/63 range from 10,300 on the segment between the Port and U.S.90 to 20,000 on the segment from U.S.90 to IH 10. AADT counts on Bayou Casotte Parkway are 12,000 (Gulf Regional Planning Council 2011).

Water access to Bayou Casotte from the Gulf of Mexico, for both commercial ships and recreational vessels, is via the Pascagoula Bar and Pascagoula Lower Sound channels.

Parks, Recreational Areas, and Other Community Facilities

Petit Bois and Horn islands are located approximately 8 miles off shore of the Port of Pascagoula, and separate Mississippi Sound from the Gulf of Mexico. These islands, along with Ship and Cat islands to the west, are a part of the GUIS, which is administered by the National Park Service (NPS 2011). These islands are protected for recreation opportunities and perseveration of natural and historical resources. In addition, these islands have received designation as Gulf Islands Wilderness and afforded special protection within the Seashore program.

While there are no state parks located within the study area, Shepard State Park is located approximately 1 mile northwest of the study area in Gautier. This park offers camping, nature trails, picnic areas, playgrounds, playing fields, disc golf, and a boat ramps (MDWFP 2011a).

More than 10 city parks operated by Pascagoula are located within the study area, and these provide a variety of services and facilities, including beach access, picnic areas, jogging trails, baseball and softball fields, disc golf, skateboarding facilities, tennis courts, soccer fields, and playground equipment (City of Pascagoula 2011d).

The Pascagoula Public School District houses approximately 6,900 students in 19 elementary, middle school and high school, as well specialty school campuses (Pascagoula School District 2011). The City of Pascagoula and Jackson County also support a number of parochial and private schools. The University of Southern Mississippi maintains a Jackson County campus at Gautier, Mississippi, and numerous other institutes of higher learning are located in the Gulfport/Biloxi, Mississippi area.

The Jackson-George Regional Library System operates a branch in Pascagoula that provides youth services and activities.

Public Safety

Jackson County has 10 fire departments, including the Pascagoula Fire Department (Jackson County Fire District 2011). The Jackson County Sheriff's Department has a main office in Pascagoula and a substation in Ocean Springs (Jackson County 2011).

Singing Rivers Health System (SRHS) is a governmental entity organized and existing pursuant to the community hospital statutes of the State of Mississippi operating as a not-for-profit organization (SRHS 2011). SRHS operates a hospital in Pascagoula as well as community clinics in the area. The hospital is full-service offering 24-hour emergency services; heart and vascular services; regional cancer center; women's and children's services; inpatient and outpatient rehabilitation services; neuroscience center; behavioral health services; wound care and hyperbaric medicine center; and hospice of light. The Pascagoula Fire Department has 58 full-time employees and equipment includes three front-line units, two standby units, one aerial 50-foot ladder truck, one rescue truck, and one standby rescue unit (City of Pascagoula 2011b). The Pascagoula Police Department has 107 employees, including 57 sworn officers. The department has four Patrol Divisions, a Criminal Investigation Division, a Court Division, a Street and School Patrol Division, a Traffic Division, an Identification Division, an Administration Division, a Training Division, and a Public Relations Division (City of Pascagoula 2011c).

Security at the Port is regulated by the USCG under the Ports, Waterways and Coastal Security (PWCS) provisions of the Homeland Security Act of 2002. The USCG, whose mission is to provide search and rescue, law enforcement, and homeland security for the near-shore waters out to 30 miles offshore and extending from Dauphin Island on the east to Biloxi Mississippi on the west, operates from USCG Station Pascagoula located on the former Singing River Island Naval Station. In addition, the station provides homeport security, drug and alien migrant interdiction, and search and rescue operations during extended deployments of home-ported cutters in the Gulf of Mexico and Caribbean. These missions are served by one medium endurance cutter (WMEC) home ported at Pascagoula. The USCG also maintains ATONs for maritime channels along the U.S. Gulf Coast, including the Pascagoula Channel.

The Station conducts an average of 100 search and rescue cases and 300 law enforcement boardings of commercial and recreational vessels annually. The USCG coordinates their activities with local law enforcement and fire departments, as well as environmental and wildlife agencies and other Federal law enforcement agencies.

Security for maritime shipping and cargo is regulated by the U.S. Customs and Border Protection, which is a division of the Department of Homeland Security. The Mississippi Office of Homeland Security provides leadership in protecting citizens of Mississippi from foreign and domestic terrorist attacks. Homeland Security is also tasked with providing leadership for the prevention, preparing against, mitigating and recovering from any anthropogenic or natural crisis (Mississippi Office of Homeland Security 2011).

The U.S. Customs and Border Patrol provide certain law enforcement services from its location at the Port of Pascagoula. The Patrol is authorized to enforce provisions of the customs and navigational laws and to inspect and accept entries of merchandise and collect duties on imports received at the Port (U.S. Customs 2011).

3.18 SOCIOECONOMICS

This section presents a summary of economic and demographic characteristics of the study area and includes information for the City of Pascagoula, Jackson County, and the State of Mississippi. Data collected to analyze the area's population, employment, economy, and environmental justice are also included in this section.

3.18.1 Population

As shown in Table 3.18-1, The City of Pascagoula's population has fluctuated since 1980, first experiencing a decline of 11.7 percent between 1980 and 1990, and then a slight increase between 1990 and 2000. Between 2000 and 2010, Pascagoula's population decreased (14.5 percent). Jackson County's population also experienced a decrease between 1980 and 1990 (by 2.3 percent), followed by an increase of 14.0 percent between 1990 and 2000. Between 2000 and 2010, Jackson County's population increased by 6.3 percent. Meanwhile, the state's population has experienced consistent moderate increases since 1980.

Table 3.18-1
Study Area Population Trends

	Population				Percent Change		
Location	1980	1990	2000	2010	1980–1990	1990–2000	2000–2010
City of Pascagoula	29,318	25,899	26,200	22,392	–11.7	1.2	–14.5
Jackson County	118,015	115,243	131,420	139,668	–2.3	14.0	6.3
Mississippi	2,520,770	2,573,216	2,844,658	2,967,297	2.1	10.5	4.3

Source: U.S. Census Bureau 1990, 2000, and 2010.

When Hurricane Katrina hit in late August 2005, it had a large impact on the population of Pascagoula and the population along the Gulf Coast. According to special estimates by the U.S.

Census Bureau, Jackson County's population decreased by 5.9 percent between July 1, 2005, and January 1, 2006, falling from 134,249 to 126,311 (U.S. Census Bureau 2006).

3.18.2 Economic Characteristics

The Mississippi Department of Employment Security (MDES) provides labor market information for the State of Mississippi through grants from the Bureau of Labor Statistics (BLS), a unit of the U.S. Department of Labor. Table 3.18-2 presents 2009 data on employment and wages by industry for Jackson County.

Table 3.18-2
2009 Employment and Wages by Industry for the Study Area

Industry	Average Monthly Employment	Percent Employment	Average Annual Wage
Jackson County			
Agriculture, Forestry, etc.	26	0.05	$17,333
Mining	108	0.22	$13,199
Utilities	471	0.94	$61,202
Construction	4,087	8.16	$48,822
Manufacturing	16,109	32.18	$61,871
Wholesale Trade	404	0.81	$41,920
Retail Trade	4,790	9.57	$22,690
Transportation	1,097	2.19	$28,787
Information	682	1.36	$31,910
Finance	995	1.99	$38,407
Real Estate	439	0.88	$28,759
Technical Services	1,984	3.96	$60,184
Comp. Management	138	0.28	$58,495
Adm. Waste	1,862	3.72	$29,106
Education Services	4,263	8.52	$32,616
Health Care	5,792	11.57	$47,096
Arts, Entertainment, and Recreation	234	0.47	$14,174
Accommodation Services	3,972	7.93	$13,671
Other Services	933	1.86	$31,227
Public Administration	1,675	3.35	$32,782
Total	50,061		

Source: MDES 2009.

According to the MDES, the manufacturing industry employs the largest percentage of the labor force with 32.18 percent, more than double the next highest employing industry, which was the health care industry with 11.57 percent of total employment. The third largest employment sector is retail trade with 9.57 percent. The industries with the highest average annual wages were manufacturing ($61,871), utilities ($61,202), and technical services ($60,184).

Based on this information it is clear that Jackson County's economy relies heavily upon the manufacturing industry. This fact is emphasized when the top employers for Jackson County are examined (Table 3.18-3). Ingalls Shipbuilding, which manufactures small and medium ship systems, is the largest employer with 10,176 employees, more than the next seven largest employers combined.

Data from the BLS were gathered to compare employment trends of the study area (Pascagoula) to the greater region (Jackson County) and the state. Labor force and unemployment information for the City of Pascagoula, as well as Jackson County and Mississippi, is presented in Table 3.18-4.

Table 3.18-3
2008 Labor Force and Employment, Jackson County

Employer	Location	No. of Employees
Ingalls Shipbuilding	Pascagoula	10,176
Singing River Hospital System	Pascagoula	2,356
Chevron Pascagoula Refinery	Pascagoula	1,214
Pascagoula School District	Pascagoula	1,200
Jackson County School District	Vancleave	1,100
Cingular Wireless	Ocean Springs	724
Signal International	Pascagoula	700
Jackson County	Pascagoula	634
Ocean Springs School District	Ocean Springs	600
Wal-Mart	Pascagoula	525
Wal-Mart	Ocean Springs	490
V T Halter	Moss Point	448
City of Pascagoula	Pascagoula	350
Mississippi Gulf Coast Community College	Gautier	290

Source: Southern Mississippi Planning and Development District 2011.

Table 3.18-4
Study Area Labor Force and Unemployment

	Labor Force			Percent Change		Unemployment Rate		
Place	1990	2000	2010	1990–2000	2000–2010	1990	2000	2010
Pascagoula	12,910	11,597	10,479	–10.2%	–9.6%	9.9%	7.7%	11.0%
Jackson County	54,944	63,505	64,127	15.6%	1.0%	7.3%	6.0%	9.4%
Mississippi	1,175,744	1,314,154	1,313,441	11.8%	–0.1%	7.7%	5.7%	10.4%

Source: BLS 2011.

As shown in Table 3.18-4, Pascagoula has experienced an overall decline in its labor force, coupled with higher unemployment rates than Jackson County and the state, which have experienced overall increases in their labor forces since 1990 (despite slight decreases between 2000 and 2010).

3.18.3 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*. The EO focuses attention of Federal agencies on the human health and environmental conditions in minority and low-income communities. Environmental justice analyses are performed to identify potential disproportionately high and adverse impacts to these communities and to identify alternatives that might mitigate these impacts. EO 12898 requires that Federal agencies conduct their programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under such programs, policies, and activities because of their race, color, or national origin.

In accordance with EO 12898 an analysis was performed to determine the presence of any minority or low-income populations that could potentially be impacted by the proposed project, and to determine whether any potential impacts to these communities would be disproportionate compared to impacts to other communities that could potentially be affected by the proposed project. For the purpose of this analysis, a minority population is defined as a group where over 50 percent of the population identified racially as Black, Asian American, American Indian, Alaskan Native, Native Hawaiian or other Pacific Islander, some other race, or two or more races, or any person (of any race, including white) who identified as Hispanic. A low-income population is defined as a population whose median household income is less than the U.S. Department of Health and Human Services (HHS) 2011 poverty guideline for a family of four ($22,350) (HHS 2011).

The Port is located within block group (BG) 1 of Census Tract (CT) 412 and the adjacent BGs are located within census tracts 419, 423, 424, and 425. Table 3.18-5 shows the U.S. Census (2000) race and ethnicity data for these census tracts, as well as corresponding data for the City of Pascagoula, Jackson County, and the State of Mississippi for comparison.

As shown in Table 3.18-5, the racial and ethnic composition of the study area block groups is similar to the City of Pascagoula overall. While two of the block groups have slightly higher minority populations than the city (34.8 percent) and Jackson County (25.8 percent), they still represent less than 50 percent of their respective populations.

Table 3.18-5
Study Area Race and Ethnicity

Place	Total Population	White	Black or African American	American Indian or Alaska Native	Asian	Native Hawaiian or Other Pacific Islander	Some Other Race or Two or More Races	Hispanic	Minority[1] Population
BG 1, CT 412	846	56.0%	29.8%	0.9%	2.5%	0.0%	2.6%	8.2%	44.0%
BG 2, CT 419	646	96.0%	2.6%	0.0%	0.0%	0.0%	1.2%	0.2%	4.0%
BG 1, CT 423	497	58.6%	40.4%	0.0%	0.0%	0.0%	0.0%	1.0%	41.4%
BG 3, CT 424	654	93.7%	2.1%	0.0%	0.2%	0.0%	1.8%	2.1%	6.3%
BG 3, CT 425	828	94.9%	1.8%	0.1%	0.5%	0.0%	1.4%	1.2%	5.0%
Pascagoula	26,200	65.2%	28.8%	0.2%	0.9%	<0.1%	0.9%	3.9%	34.8%
Jackson County	131,420	74.2%	20.8%	0.3%	1.5%	<0.1%	1.0%	2.1%	25.8%
Mississippi	2,844,658	60.7%	36.2%	0.4%	0.6%	<0.1%	0.7%	1.4%	39.3%

[1]The minority population is composed of individuals who identify themselves racially as Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Some Other Race or Two or More Races, or a person of any race who identifies as Hispanic.

The median household incomes of the study area block groups are $2,500 (BG 1, CT 412), $60,417 (BG 2, CT 419), $25,682 (BG 1, CT 423), $29,904 (BG 3, CT 424), and $44,350 (BG 3, CT 425). The median household income of BG 1, CT 412 is substantially lower than the HHS poverty threshold ($22,350), and represents a low-income population. None of the remaining block groups had a median household income below the HHS poverty threshold.

3.18.4 Protection of Children

On April 21, 1997, President Clinton issued EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO recognizes a growing body of scientific knowledge that demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because children's bodily systems are not fully developed; because children eat, drink, and breathe more in proportion to their body weight; and because their behavior patterns may make them more susceptible to accidents. Based on these factors, the President directed each Federal agency to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. The President also directed each Federal agency to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Overall, the percentage of children in the study area block groups is at or below the 27 percent average for the City of Pascagoula, Jackson County, and the State of Mississippi (U.S. Census Bureau 2000). There are no children in BG 1, CT 412, as it is primarily industrial land use. Examples of risks to children include increased traffic volumes and industrial or production oriented activities that would generate substances or pollutants children might ingest or come in contact with. Based on totals shown above, there are no disproportionately large populations of children living near the Port.

4.0 ENVIRONMENTAL CONSEQUENCES

Section 4 presents the environmental impacts of the proposed alternatives, including the No-Action Alternative, the Preferred Alternative, and Alternative 2. An impact is defined as change to the human or natural environment as a result of an action. The results of the analysis of the potential environmental consequences anticipated as a result of the proposed alternatives considered as part of this EIS are described in this section. Examination of existing environmental conditions provides the context for understanding the potential environmental impacts of the proposed project, as they presently exist and as they would exist under implementation of each of the alternatives. Impacts can be beneficial or adverse, can be a primary result of an action (direct) or a secondary result (indirect), and can be permanent or long lasting (long term) or temporary and of short duration (short term). An impact is a direct result of an action which occurs at the same time and place or an indirect result of an action which occurs later in time or in a different place and is reasonably foreseeable. Impacts can vary in degree from a slightly noticeable change to a total change in environment.

Impacts are based on significance criteria. According to NEPA Regulations adopted by CEQ (40 C.F.R. 1500–1508), the term *significance* is based on the twin criteria of *context* and *intensity* (40 C.F.R. 1508.27). Significance criteria were developed for the affected resource categories, and for many of the categories, are necessarily qualitative in nature. Quantitative criteria can be established when there are specific numerical limits established by regulation or industry standard. These criteria are based on existing regulatory standards, scientific and environmental documentation, and/or professional judgment. Impacts do not necessarily mean negative changes, and any detectable change is not, in and of itself, considered to be negative. In the following discussions, the impacts are considered adverse unless identified as beneficial. The analyses presented here for environmental consequences consider context and intensity with respect to significant impacts for the resources, based on the data available for each resource. Cumulative effects are addressed in Section 5. If the impact is significant, it may be mitigable (i.e., measures are available to reduce the level of impact) or unmitigable. Mitigation is discussed in this section for each resource and alternative if it is required. Unless otherwise indicated, no mitigation is required.

4.1 GEOLOGY

The significance criterion for the geology of the Bayou Casotte Channel and Pascagoula Lower Sound Channel is a permanent change in underlying geologic features that interfere with the natural movement and deposition of sediments in the Mississippi Sound.

4.1.1 No-Action Alternative

No significant adverse impacts to the underlying geology are anticipated with the No-Action Alternative. However, sedimentation in the channel and regularly scheduled maintenance dredging performed by the USACE would result in periodic, slight changes to the bottom depths of the existing channel.

4.1.2 Preferred Alternative

Sediments contained within authorized dimensions and defined in the dredge prism would be removed by mechanical or hydraulic dredging under the Preferred Alternative. The total length of the dredging area is approximately 7.2 miles from the northern extent of the Bayou Casotte Channel to the southern extent of the transition between the Pascagoula Lower Sound Channel and Horn Island Pass. The entire channel length would be dredged to the authorized depth (–42 feet MLLW plus 2 feet of advanced maintenance). An allowable overdepth of 2 feet will be used for the proposed dredging activities and is included in the dredging volume (Anchor QEA 2012).

The total dredging quantity for this alternative is estimated to be 3.4 mcy. As previously discussed, approximately 96 percent (3.3 mcy) of this quantity is estimated to be silt and clay and would be transported and placed at the Pascagoula ODMDS. The remaining 125,000 cy has a higher sand fraction and can be used for beneficial use at the LZA adjacent to Horn Island (Anchor QEA 2012). Sediments would be placed in designated disposal areas according to approved disposal methods. Maintenance dredging of the new channel would result in permanent removal of those dredged sediments. However, the amount of sediments removed and relocated are not expected to interfere with the natural movement and deposition of sediments in the Mississippi Sound. Therefore, no significant adverse impacts are anticipated.

4.1.3 Alternative 2

The total dredging quantity for Alternative 2 is an estimated 3.3 mcy. As previously discussed, approximately 90 percent (3.0 mcy) of this quantity is estimated to consist of silt and clay material, which would be transported and placed at the Pascagoula ODMDS. The remaining 315,000 cy located in the southern reach, has a higher sand fraction and can be utilized for beneficial use at the LZA adjacent to Horn Island. Dredging activities and placement options for this alternative are identical to those presented for the Preferred Alternative (Anchor QEA 2012). Potential impacts on Geology resulting from Alternative 2 would be the same as those described in subsection 4.1.2.

4.2 COASTAL PROCESSES

This section describes the potential environmental consequences the proposed project may have on the coastal processes such as tides, currents, and consequently, sediment transport. Potential impacts to coastal processes would be considered significant if there is a substantial alteration in these components as a result of the channel widening as part of the proposed project.

4.2.1 No-Action Alternative

Under the No-Action Alternative, no significant adverse impacts to coastal processes are anticipated, as no new activities would occur. Impacts would be limited to those associated with maintenance dredging of the channels.

4.2.2 Preferred Alternative

The Preferred Alternative would widen the existing Pascagoula Lower Sound/Bayou Casotte Channel from 350 to 450 feet and increase the channel size by approximately 30 percent. However, the proposed channel widening would make up approximately 0.001 square mile of the total 1,850 square miles of the Mississippi Sound and is not anticipated to impact the overall coastal processes in the Sound due to the large scale at which coastal processes occur. Placement of dredged sediments in the LZA may have a positive effect by placing more sand into the littoral drift along Horn Island, thus slightly reducing erosion. The bulk of the material going to the ODMDS should have no effect on littoral processes.

4.2.3 Alternative 2

The increase in channel size under Alternative 2 would be the same as that described for the Preferred Alternative.

4.3 BATHYMETRY

Impacts of dredging are considered adverse if dredging results in permanent changes in bathymetry that significantly affect currents, tides, and/or natural water movement in the Mississippi Sound. Significant alterations to these physical characteristics would in turn affect water quality (e.g., salinity stratification) and fish and wildlife habitat (e.g., seagrasses).

4.3.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue). Maintenance dredging associated with the No-Action Alternative would continue to remove sediments from the existing channel and the channel would remain at its current width and depth. Dredged sediments would continue to be placed at current LZA and ODMDS locations. Therefore, no significant alterations to bathymetry are anticipated.

4.3.2 Preferred Alternative

The Preferred Alternative would permanently change the bathymetry of the 100-foot corridor to be widened along 7.2 miles of the existing channel. The widened portion of the channel would be dredged from present depths less than 20 feet to the federally authorized –42 feet MLLW, consistent with the existing channel.

These changes would not impact areas outside of the area of physical disturbance and the permanent alteration would be minor. Circulation patterns in the project area are driven by astronomical tides, winds, and to a lesser degree, freshwater discharge. Therefore, the project would have no effect on circulation patterns and impacts to currents, tides, and other water movements are not anticipated. Potential impacts to water quality and habitat are detailed in sections 4.9, Water Quality, and 4.12, EFH, and indicate that no significant impacts to these resources are anticipated under the Preferred Alternative.

Dredged material management would include placement of approximately 125,000 cy of the dredged material in the designated LZA located east and south of Horn Island and placement of the remainder of the material (approximately 3.3 mcy) at the Pascagoula ODMDS south of Horn Island. Placement of dredged material will temporarily increase the elevation of the placement sites, but will restore sediment streams into the Sound and are therefore not anticipated to have any effect on currents, tides, or other water movements in the Sound. A review of bathymetry change data from 1917 to 1971 does not indicate, however, that significant deposition would occur outside of those areas immediately adjacent to the navigation channels where historic side casting occurred (USACE 2007). In addition, any impacts to bathymetry from placement of dredged material from the Preferred Alternative in the Pascagoula ODMDS would not be considered adverse since the area was designed as a disposal area and the dredged material testing indicates the material is acceptable for open-water disposal. Placement of dredged material will incorporate one or a combination of methods detailed in subsection 2.3.2 and in the DMMP in Appendix B.

4.3.3 Alternative 2

Permanent changes to the bathymetry along the proposed channel as a result of Alternative 2 are the same as those described for the Preferred Alternative, with the exception of volume of dredged material. Under Alternative 2, a total of 3.3 mcy of dredged material would be excavated to widen the channel 50 feet on either side of the existing channel. Approximately 315,000 cy of beneficial use material would be placed at the LZA and the remainder would be placed at the ODMDS.

4.4 HYDRODYNAMICS

Impacts to hydrodynamics in the study area would be considered significant if the proposed project resulted in a permanent disruption in current and tide patterns, a permanent adverse change in salinity in the Mississippi Sound, or significantly affected the potential for storm surge propagation. Small changes would not be considered significant.

4.4.1 No-Action Alternative

No changes or adverse impacts to the existing circulation patterns, tides, wave action, or salinity would be expected as a result of the No-Action Alternative. Existing alterations due to ongoing channel maintenance and other activities in the area would continue.

4.4.2 Preferred Alternative

Circulation patterns in the project area are driven by astronomical tides, winds, and to a lesser degree, freshwater discharge (Orlando et al. 1993, Seim et al. 1987). The Mississippi Sound has substantial openings in the barrier island system.

The proposed 100-foot widening of the Pascagoula Lower Sound and Bayou Casotte Channel in the Sound will not increase the existing width of Horn Island Pass. The placement of dredged material in the designated LZA located east and south of Horn Island and placement of the remainder of the material (approximately 3.3 mcy) at the Pascagoula ODMDS south of Horn Island will also not affect Horn Island Pass. This is important because the barrier islands provide some division between the Gulf and Mississippi Sound.

In theory, any increase in the opening between the Gulf of Mexico and Mississippi Sound would allow more water to pass on each tidal cycle, resulting in greater tidal amplitude and tidal currents. However, with no change in the barrier island opening, no significant change or adverse impacts to tides or tidal currents would be expected. With no change in the barrier island opening, no change in storm surge propagation potential would be expected.

The existing openings between the barrier islands are substantial and there are also existing deeper navigation channels between the barrier islands. Consequently, salinities in Mississippi Sound are strongly influenced by the Gulf of Mexico. For example, EPA water quality monitoring from 2000 to 2004 for the study area, including Pascagoula Harbor to the Gulf, documented an average salinity of 25.29 ppt (EPA 2011c). With Mississippi Sound salinity averaging approximately 25 ppt, and the Gulf salinity being 35 ppt (or less following rains), there is not a strong salinity gradient between the Port of Pascagoula and the Gulf of Mexico.

Effects of salinity with respect to dredging projects are generally in terms of the deepening of a channel. Channel deepening will allow a salt water wedge to propagate further upstream and to attain a higher interface of the salinity freshwater interface in the water column. The higher location of this interface in the water column will mean that more saltwater will get mixed with freshwater with the passage of a ship (note that the passage of a ship mixes water from its passage through the water and by it propeller acting as a mixer). Widening a channel would not have any influence of the location of the saltwater freshwater interface and would not change the amount of mixing from the passage of a ship.

The classic estuarine density current is a relatively small but important component of the current that is due to the horizontal density (salinity) gradient. The density current reduces the horizontal density gradient and the higher density saline water at lower depths flows under the less saline water farther inshore.

This process occurs in estuaries with or without deeper navigation channels but is accentuated by deep-draft channels. For example, Ward (1983) determined that the magnitude of a density current is proportional to the cube of depth. If a navigation channel was dredged to twice the natural depth, the density current would be eight times greater in intensity over the width of the channel.

The density current is a function of the longitudinal salinity gradient. If an estuary receives no freshwater inflow for a period of time and has essentially the same salinity from the head to the mouth, there will be no density gradient to drive a current, even if there is some vertical density difference. Conversely, if there is a strong salinity gradient from head to mouth of an estuary, produced by freshwater inflows at the head of the estuary, the density current will be at its maximum, acting to mix the more saline and dense Gulf of Mexico water with the relatively fresh and less dense water introduced by river inflows.

The proposed modification is a 100-foot widening on the western side of the channel with no further increase in channel depth. Without an increase in depth, the density current strength would not change, but would be extended by the additional channel width. However, while the channel bottom width would increase by approximately 30 percent, that width increase represents a very small portion of Mississippi Sound width. While the density current in the Sound is not as strong as in the deeper navigation channel, it is acting over tens of thousands of feet of width and mixes much more water than the navigation channel.

As noted above, the density current is most significant when there is a strong longitudinal salinity gradient such as what might occur after a period of high runoff flows from streams flowing into the Mississippi Sound. Assuming the Gulf of Mexico salinity was not affected significantly, the high inflow would produce a strong salinity gradient from the shore to the Gulf. An increase in channel width would allow more water to be carried in the density current and allow the salinity gradient to return to normal slightly more quickly. For example, if it required 1 month for the salinity levels to approach a value representative of longer-term equilibrium with the existing channel, it would require slightly less time with the wider channel.

The effect of channel widening would thus slightly reduce the time required for salinity levels to approach normal after a period of heavy rain. This can be expected to increase the long-term average salinity in the Sound by some amount, although such a change would be small and very difficult to detect with the types of monitoring that currently exist. A detailed numerical modeling process would be required to quantify this small effect. A suitable 3-D modeling project could quantify the changed response time associated with simulated inflow events. The channel widening would have little effect on salinity concentrations in dry periods because the salinity gradient would be small (the Sound would already have salinity concentrations close those of the Gulf of Mexico) and the density current would be very small. Overall, no significant adverse impacts on the hydrodynamics of Mississippi Sound are expected due to the primary influences of tides, winds, and salinity from the Gulf in the study area.

4.4.3 Alternative 2

Potential impacts on hydrodynamics resulting from Alternative 2 would be the same as those described under the Preferred Alternative in subsection 4.4.2.

4.5 NAVIGATION AND PORT FACILITIES

This section describes the potential environmental consequences the proposed project may have on navigation and port facilities, including the Pascagoula Harbor Channels and turning basin, the Mississippi Sound, commercial vessel traffic, ATONs, visibility and weather restrictions, and charter fishing vessels and recreational boaters. Potential impacts to these facilities would be considered significant if alterations resulted in a reduction in the ability of the facilities to provide safe transit for mariners or a substantial increase in vessel traffic.

4.5.1 No-Action Alternative

Under the No-Action Alternative, the facilities' ability to provide safe transit would not change; however, operational constraints would continue. The current conditions restrict deep-draft vessels to one-way traffic, restrict vessels greater than 700 feet length overall (LOA) or draft greater than 36 feet to daylight travel, and impose restrictions on travel due to wind and current conditions.

4.5.2 Preferred Alternative

Pascagoula Harbor Channels and Turning Basin

No changes to waterside access are proposed. Access will remain via the Pascagoula Bar Channel, the Gulf of Mexico entrance channel through the Horn Island Pass Channel to the Pascagoula Lower Sound Channel through the Mississippi Sound north to the 'Y' and then either through the Pascagoula Upper Sound Channel to the Pascagoula River terminating at the railroad bridge crossing or the through the east branch of the 'Y' to the Bayou Casotte Channel and into the Mississippi Sound to the mouth of Bayou Casotte Harbor.

The Preferred Alternative would not be expected to have an effect on the Port of Pascagoula's commodity base. Subject to market influence, inbound cargo of forest products, crude oil, phosphate rock, chemicals and aggregate and outbound cargo of forest products, paper products, frozen poultry, petroleum products, fertilizer chemicals and project cargo should remain in similar proportions. However, traffic of vessels greater than 700 feet in length and 125 feet in beam will be expedited and fewer diversions of LNG to alternate ports are anticipated under the Preferred Alternative.

Changes to public and private terminals in the Pascagoula River and Bayou Casotte Harbors are not planned as part of the Preferred Alternative. Consequently, the Preferred Alternative will not change the facilities' ability to provide safe transit nor cause an increase in traffic, therefore no significant impacts are anticipated.

Commercial Vessel Traffic

A majority of the cargo traffic in the Mississippi Sound are tugs and barges, which generally travel in an east/west direction through the GIWW. Since the majority of this Mississippi Sound traffic is thru traffic which merely crosses the channel, traffic passing through the Mississippi Sound via the GIWW is not expected to be significantly affected by the Preferred Alternative. The JCPA states that the port's vessel fleet is forecast to grow over their study period (present–2046) however; the Preferred Alternative will not affect the rate of growth of the fleet or subsequent vessel traffic in the channel, therefore, no significant impacts to vessel traffic are anticipated.

Vessels greater than 700 feet in length and 125 feet in beam are currently limited by the Pascagoula Bar Pilots Association to transiting the channel during daylight hours. The Pilots have indicated that these restrictions would be eased upon construction of the Preferred Alternative. Currently, most vessel activity occurs from early-morning through the afternoon. Following the proposed widening, additional night-time transits and limited two-way traffic and additional nighttime transits will allow more flexibility in vessel arrival and departure times. These efficiencies would result in reduced operating costs for vessel operators and greater availability of marine terminals. Economic impacts are discussed in subsection 4.18.2.2.

Aids to Navigation

The Preferred Alternative will impact existing USCG-maintained ATONs along the western side of the channels. Channel widening will disrupt the mooring piles and anchors for eight range structures, five lights, and ten buoys. The widening will also change the geometry of the channel the ATONs demarcate. Consequently, these ATONs will have to be relocated. Relocation will involve installation of new mooring piles for five lights; the range structures will have to be removed and either relocated or replaced in their new locations; the buoys will have to be relocated by either moving their existing anchors to their new locations or by installing new anchors, cable and chain tethers at their new location and then attaching the existing buoys. With the proposed relocation of the ATONs, the channel will maintain a similar ability to provide safe transit through the channel, therefore, no significant impacts are anticipated.

Visibility and Weather Restrictions

Due to the restrictive nature of the existing channel, the Pascagoula Bar Pilots Association provides guidelines for limiting navigation to daylight hours only and the addition of a second pilot when visibility and weather conditions are poor. A wider channel will provide a safer transit, reducing these restrictions and alleviate existing restrictions, therefore, no significant impacts are anticipated.

Charter Fishing Vessels and Recreational Boaters

The GIWW supports considerable commercial activity but is also used extensively by recreational boaters. The shallow drafting recreational boats are not restricted to the deep shipping channels and have nearly full access throughout the Mississippi Sound. Consequently, the charter and recreational boaters are not expected to be significantly impacted by the Preferred Alternative.

4.5.3 Alternative 2

The increase in channel size under Alternative 2 would be the same as that described for the Preferred Alternative and the impacts would, therefore, be the same as those described for the Preferred Alternative.

Commercial Vessel Traffic

The increase in channel size under Alternative 2 would be the same as that described for the Preferred Alternative and the impacts would, therefore, be the same (not significant) as those described for the Preferred Alternative.

Aids to Navigation

Alternative 2 will impact existing USCG-maintained ATONs along the eastern and western sides of the channels. Eighteen buoys and ten fixed lights will be relocated. With the proposed relocation of the ATONs, the channel will maintain a similar ability to provide safe transit through the channel, therefore, no significant impacts are anticipated.

Visibility and Weather Restrictions

Due to the restrictive nature of the existing channel, the Pascagoula Bar Pilots Association provides guidelines for limiting navigation to daylight hours only and the addition of a second pilot when visibility and weather conditions are poor. A wider channel may reduce these restrictions and would alleviate existing restrictions, therefore no significant impacts are anticipated.

Charter Fishing Vessels and Recreational Boaters

The GIWW supports considerable commercial activity but is also used extensively by recreational boaters. The shallow drafting recreational boats are not restricted to the deep shipping channels and have nearly full access throughout the Mississippi Sound. Consequently, the charter and recreational boaters are not expected to be significantly impacted by the Preferred Alternative.

4.6 AIR QUALITY

This section provides a discussion of the air quality impacts associated with the No-Action and proposed alternatives. It addresses both direct and indirect effects and discusses their impacts relative to the inventory of air emissions for the Jackson County area.

The evaluation of impacts to air quality associated with the alternatives was based on the identification of air contaminants and estimated emission rates. The air contaminants considered are those covered by the NAAQS and monitored by Jackson County including carbon monoxide (CO), ozone (O_3), nitrogen oxide (NO_X), particulate matter with diameters less than 10 microns (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and sulfur oxides (SO_X). An assessment of GHG emissions is included in Section 4.15, Climate Change/ Sea Level Rise.

The construction sequences for the proposed project alternatives are very similar and require the excavation, transport, and deposition of the dredged material into the existing ODMDS and the LZA (Anchor QEA 2012). Air emissions were considered for channel widening activities and emissions from vehicular traffic associated with the project employee commute for the two construction alternatives. The construction alternatives and corresponding volumes are:

- Preferred Alternative – widen 100 feet to the west, with an estimated 3.4 mcy of dredged material.
- Alternative 2 – widen 50 feet on both sides of the channel, with an estimated dredged volume of 3.3 mcy.

Air Emissions

Air emissions were also estimated for activities associated with relocation of the centerline ranges by the USCG relating to the Preferred Alternative. Project emissions were estimated based on preliminary assumptions regarding construction equipment (Appendix E). It is not within the scope of this analysis to perform the refined dispersion modeling necessary to predict concentrations for each contaminant and alternative. Rather, the impact of emissions was analyzed relative to the existing inventory for air contaminant emissions in Jackson County.

The estimated air contaminant emissions, except O_3 and its precursors, were compared to the 2002 emissions inventory for the Jackson County area. Assuming an increase in air emissions will result in a corresponding increase in the ambient air concentration for that air contaminant, the ratio of the estimated emissions to the existing 2002 emissions for that contaminant provided a relative indication of the potential increase in ambient concentrations for the air contaminant. As discussed in subsection 3.6.2, monitored values suggest that concentrations of air contaminants for this area are well below the NAAQS. Because air emissions are generally dispersed with distance and time, a relatively small increase in emissions may be assumed to cause a correspondingly small increase in ambient air quality concentrations for that air contaminant, and it is therefore, expected that the increase in emissions will not cause an exceedance of the NAAQS.

As discussed in subsection 3.6.3, the CAA, under 42 U.S.C. 7506(c)(1), prohibits Federal agencies from funding, permitting, or licensing any project that does not conform to an applicable SIP. The purpose of this General Conformity requirement is to ensure Federal agencies consult with state and local air quality districts to assure these regulatory entities know about the expected impacts of the Federal action and can include expected emissions in their SIP emissions budget. The conformity requirements were promulgated to ensure attainment and maintenance of the NAAQS and to ensure that Federal actions will not cause or contribute to new violations of the NAAQS. Because permitting for the project is considered a Federal Action, emissions were also considered in terms of the General Conformity Rules. A General Conformity Determination is required for each pollutant where the total of direct and indirect emissions in a nonattainment area would exceed emission thresholds as specified in the General Conformity Rules (40 C.F.R § 93.153(b)(1)).

Based on a preliminary review by the EPA of ozone air quality data from 2008–2010, the EPA developed an initial list of areas exceeding the 2008 ozone standard. This preliminary listing includes the Gulfport-Biloxi-Pascagoula (GBP) combined statistical area (areas for which air quality statistics are calculated) with a potential classification of “marginal” under the 0.075 ppm ozone standard. A final determination of nonattainment area designations is expected by mid-2012. Based on the EPA’s report, the review of the ozone standard will continue, and the EPA will propose revisions to the NAAQS in 2013 that will be finalized by rulemaking in 2014 (EPA 2011a)

The proposed project is located in the GBP combined statistical area and if the area is designated a nonattainment area under the new 8-hour ozone standard, a General Conformity Determination may be required by the EPA and the MDEQ so as to ensure expected emissions from the project are included in the new SIP emissions budget. EPA defines “de minimis” levels as the minimum threshold for which a conformity determination must be performed for various criteria pollutants in various areas. For purposes of this analysis, it is assumed that the de minimis thresholds for O_3 precursor pollutants are 100 tons per year (tpy) of VOC or of NO_X consistent with the de minimis level for a “marginal” nonattainment area under the General Conformity Rules. Based on this assumption, if the alternatives result in air emissions of less than 100 tpy for either of these air contaminants, the General Conformity Rules would not require a General Conformity evaluation, and no further analysis is required to demonstrate that such actions conform to the SIP. If below the de minimis levels, emissions from the project may be presumed to conform and considered a less than significant impact on attainment of the 8-hour O_3 ambient air quality standard for this region.

Methods Used for Estimation of Air Contaminant Emissions

The primary air contaminant emissions from this project would be from dredging activities, emissions from the multi-purpose vessel used for centerline range relocation, and secondary emissions resulting from the work truck and employee vehicular traffic. The basis for emissions included the following:

- Preliminary project information (Anchor QEA 2012 and Appendix E).
- Emissions from harbor vessels in support of the dredging activities were estimated for the year 2014 and 2015, as the project is expected to begin in the third quarter of 2014 with completion in the second or third quarter of 2015. The basis for emissions estimates consisted of the operating hours for each specific type of equipment engine, engine load factor, and engine horsepower. Emission rates (tons per hour) from dredges and support vessels, the multi-purpose construction vessel, and auxiliary equipment were calculated for each criteria pollutant based on the following formula:

  Emission Rate = Engine Horsepower x 0.746 kilowatt per Engine Horsepower x Engine Load Factor x Emission Factor (grams per horsepower-hour) ÷ 453.59 grams per pounds ÷ 2,000 pounds per ton

  Load factors and emission factors for the different marine equipment were determined based on the EPA report titled "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data" (EPA 2000). Emission amounts (tpy) for each of the pollutants were then calculated based on the following formula:

  Emission Amount (tpy) = Emission Rate (tons/hr) x Working Hours (hrs/year)

  Mobile on-road emissions associated with a single work truck and employee vehicles were calculated assuming the vehicles would meet the emission standards promulgated by the EPA for light duty vehicles and trucks in 40 C.F.R. Part 86, Control of Emissions from New and In-Use Highway Vehicles and Engines. An average commute of 125 miles each way was assumed for each vehicle. The total number of miles traveled equaled the number of miles per trip multiplied by the total number of days of activity times the number of vehicles.

  Detailed emission calculations can be found in Appendix E.

4.6.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue). No construction or new operating emission sources are associated with the No-Action Alternative. However, it is expected that air contaminant emissions would increase due to continued operational constraints on the existing system (i.e., congestion and inefficient use of channels and harbors) and projected increased ship traffic resulting both from growth of existing business and from new business at the Port.

4.6.2 Preferred Alternative

Air emission sources for the Preferred Alternative will consist of harbor vessels and land-based mobile sources that will be used during the channel widening activities, as follows:

- Harbor Vessels – dredges, one support vessel, and a multipurpose construction vessel; and
- On-road vehicles including one work truck and private employee vehicles.

Air contaminant emissions associated with the Preferred Alternative would be primarily combustion products from fuel burned in equipment used for project dredging, construction and on-road vehicles. The harbor vessel emission sources will be diesel-powered engines. The on-road vehicles were all assumed to be gasoline-powered. Air emissions estimates for vessels use horsepower (HP) as a component of the calculation (Dinh 1999). Cutter suction dredges are more efficient and use less energy when compared with hopper dredges, therefore, although a combination of dredges are anticipated, emissions estimates provide conservative vessel emission estimates.

4.6.2.1 Air Quality Analysis Results

Emissions from the activities associated with the Preferred Alternative would include VOC, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$. As $PM_{2.5}$ is a subset of PM_{10} particles, when the estimation model used did not specifically provide a $PM_{2.5}$ emission rate, the estimated $PM_{2.5}$ emission rate was conservatively assumed to be equivalent to that of PM_{10}. These activities would be considered one-time activities (i.e., the channel widening activities would not continue past the date of completion).

A summary of the estimated emissions in total tons estimated for the Preferred Alternative is presented in Table 4.6-1.

Table 4.6-1
Total Estimated Construction Emissions by Source, Preferred Alternative

Air Contaminant	Dredging Equipment Emissions (tons)	Multi-Purpose Construction Vessel Emissions (tons)	On-road Vehicle Emissions (tons)	Total Emissions (tons)
CO	96.09	0.07	1.02	97.18
NO_X	963.01	0.70	0.11	963.82
PM_{10}	22.92	0.02	0.01	22.95
$PM_{2.5}$	21.73	0.02	0.01	21.76
SO_2	48.08	0.03	0.00	48.11
VOC	8.66	0.01	0.04	8.71

The maximum annual air contaminant emission rates estimated for the Preferred Alternative were then compared to the 2002 emissions inventory for Jackson County. Construction would be scheduled to begin third quarter 2014 and be completed second or third quarter 2015. Estimated total emissions presented here are based on an assumption of 6 months of construction per year in 2014 and 2015, therefore, emissions estimates represent 50 percent of the emissions for each year. The comparison is presented in Table 4.6-2.

Table 4.6-2
Total Estimated Project Emissions, Preferred Alternative
Compared with Jackson County Emissions (2002)

Air Contaminant	Total Maximum Estimated Project Emissions (tpy)*	Jackson County Emissions (tpy)	Site Emissions % of Jackson County Emissions
CO	48.63	58,090	0.08
NO_X	482.26	32,712	1.47
PM_{10}	11.48	10,248	0.11
$PM_{2.5}$	10.89	3,694	0.29
SO_X	24.08	35,726	0.07
VOC	4.36	32,472	0.01

*Maximum annual emissions are anticipated to occur in 2015 due to centerline range relocation activities.

As shown in Table 4.6-2, air contaminant emissions from the Preferred Alternative would result in a relatively small increase in emissions above those from existing sources in the county. As a result, it is expected that air contaminant emissions from the combustion of fuel in equipment used for project construction activities would also result in correspondingly minor short-term impacts on air quality in the immediate vicinity of the project area. Due to the anticipated short-term duration of the channel widening activities, there would be no long-term impacts, and therefore emissions from these activities are not expected to adversely impact the long-term air quality in the area. In general, increased efficiencies, increased import of cleaner fuels, and the use of newer, cleaner, and more-efficient fuel burning equipment would decrease fossil fuel consumption and have a net positive impact on air quality.

4.6.2.2 General Conformity

For comparison with the thresholds defined in the General Conformity Rule, the estimated emissions of NO_X and VOC for the Preferred Alternative are summarized in Tables 4.6-3 and 4.6-4 for each year of anticipated project construction activity. As previously noted, it is anticipated that construction could start in the third quarter of 2014 and be completed in the second or third quarter of 2015. It is assumed the USCG centerline range relocation activities would occur in 2015 as the dredging activities are nearing completion. Emissions of CO, SO_2, and particulate matter are not considered in the General Conformity evaluation, as Jackson County is in attainment with the NAAQS for those pollutants.

As shown in Table 4.6-3, emissions of VOC for project construction activities are exempt from a General Conformity Determination because they are below the 100 tpy threshold.

Table 4.6-3
Summary of VOC Emissions (tpy), Preferred Alternative

Activity	2014	2015
Dredging Activities	4.33	4.33
Centerline Range Relocation		0.01
On-Road – Work Truck and Employee Commuter Vehicles	0.02	0.02
Totals	4.35	4.36

As shown in Table 4.6-4, NO_X emissions for project construction activities show the project would exceed the conformity threshold, i.e., greater than 100 tpy, for 2014 and 2015. If Jackson County is designated a nonattainment area during this time period, a General Conformity Determination for NO_X emissions may be required for these years. As part of the General Conformity process, the USACE, in consultation with MDEQ and EPA, would prepare a discussion on whether emissions that would result from the Preferred Alternative would be in conformity with the Mississippi SIP for this area. Although the designation of nonattainment areas and the deadlines for submittal of the SIPs for this area are anticipated in the near future, development of the SIP may not include this project due to its relatively short duration. Additional coordination with the EPA and the MDEQ is anticipated dependent on the timing of the nonattainment designations and the timing for development and submittal of the SIP.

Table 4.6-4
Summary of NOX Emissions (tpy), Preferred Alternative

Activity	2014	2015
Dredging Activities	481.50	481.50
Centerline Range Relocation		0.70
On-Road – Work Truck and Employee Commuter Vehicles	0.05	0.05
Totals	481.56	482.26

4.6.3 Alternative 2

Air emission sources for this alternative will consist of harbor vessels and land-based mobile sources that will be used during the channel widening activities, as follows:

- Harbor Vessels – dredges and one support vessel; and
- On-road vehicles, including one work truck and private employee vehicles.

Air contaminant emissions associated with the channel widening would be primarily combustion products from fuel burned in equipment used for project dredging and on-road vehicles. The harbor vessel emission sources will be diesel-powered engines. The on-road vehicles were all assumed to be gasoline-powered. For this alternative, it was assumed the centerline range relocation activities would not require a dedicated multi-purpose construction vessel as the USCG would accomplish the channel marker relocations as part of their routine patrol (Appendix E).

4.6.3.1 Air Quality Analysis Results

Emissions from the activities associated with Alternative 2 would include VOC, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$. As $PM_{2.5}$ is a subset of PM_{10} particles, when the estimation model used did not specifically provide a $PM_{2.5}$ emission rate, the estimated $PM_{2.5}$ emission rate was conservatively assumed to be equivalent to that of PM_{10}. These activities would be considered one-time activities (i.e., the channel widening activities would not continue past the date of completion).

A summary of the estimated emissions in total tons estimated for Alternative 2 is presented in Table 4.6-5.

Table 4.6-5
Total Estimated Project Construction Emissions by Source, Alternative 2

Air Contaminant	Dredging Equipment Emissions (tons)	On-road Vehicle Emissions (tons)
CO	96.09	1.02
NO_X	963.01	0.11
PM_{10}	22.92	0.01
$PM_{2.5}$	21.73	0.01
SO_2	48.08	0.00
VOC	8.66	0.04

The maximum annual air contaminant emission rates estimated for Alternative 2 were then compared to the 2002 emissions inventory for Jackson County. The comparison is presented in Table 4.6-6.

Table 4.6-6
Total Estimated Project Emissions – Alternative 2
Compared With Jackson County Emissions (2002)

Air Contaminant	Total Maximum Estimated Project Emissions (tpy)*	Jackson County Emissions (tpy)	Site Emissions % of Jackson County Emissions
CO	48.56	58,090	0.08
NO_X	481.56	32,712	1.47
PM_{10}	11.47	10,248	0.11
$PM_{2.5}$	10.87	3,694	0.29
SO_X	24.04	35,726	0.07
VOC	4.35	32,472	0.01

*Maximum annual emissions are anticipated to occur in either 2014 or 2015 due to anticipated schedule.

As shown in Table 4.6-6, air contaminant emissions from Alternative 2 would result in a relatively small increase in emissions above those from existing sources in the county. As a result, it is expected that air contaminant emissions from the combustion of fuel in equipment used for project construction activities would also result in correspondingly minor short-term impacts on air quality in the immediate vicinity of the project area. Due to the anticipated short-term duration of the channel widening activities, there would be no long-term impacts, and therefore emissions from these activities are not expected to adversely impact the long-term air quality in the area.

4.6.3.2 General Conformity

For comparison with the thresholds defined in the General Conformity Rule, the estimated emissions of NO_X and VOC for Alternative 2 are summarized in Tables 4.6-7 and 4.6-8 for each year of anticipated project construction activity. As previously noted, it is anticipated that construction could start in the third quarter of 2014 and be completed in the second or third quarter of 2015. Emissions of CO, SO_2, and particulate matter are not considered in the General Conformity evaluation, as Jackson County is in attainment with the NAAQS for those pollutants.

As shown in Table 4.6-7, emissions of VOC for project construction activities are exempt from a General Conformity Determination because they are below the 100 tpy threshold.

Table 4.6-7
Summary of VOC Emissions (tpy) – Alternative 2

Activity	2014	2015
Dredging Activities	4.33	4.33
On-Road – Work Truck and Employee Commuter Vehicles	0.02	0.02
Totals	4.35	4.35

As shown in Table 4.6-8, NO_X emissions for project construction activities show the project would exceed the conformity threshold, i.e., greater than 100 tpy, for 2014 and 2015. If Jackson County is designated a nonattainment area during this time period, a General Conformity Determination for NO_X emissions may be required for these years. As part of the General Conformity process, the USACE, in consultation with MDEQ and EPA, would prepare a discussion on whether emissions that would result from the Alternative 2 would be in conformity with the Mississippi SIP for this area. Although the designation of nonattainment areas and the deadlines for submittal of the SIPs for this area are anticipated in the near future, development of the SIP may not include this project due to its relatively short duration. Additional coordination with the EPA and the MDEQ is anticipated dependent on the timing of the nonattainment designations and the timing for development and submittal of the SIP.

Table 4.6-8
Summary of NO_X Emissions (tpy), Alternative 2

Activity	2014	2015
Dredging Activities	481.50	481.50
On-Road – Work Truck and Employee Commuter Vehicles	0.05	0.05
Totals	481.56	481.56

4.7 NOISE

The significance criterion for noise impacts on human beings as a result of the proposed project would be permanent elevated noise levels when compared to existing conditions. Disrupting nesting behavior in marine birds would be a significance criterion for surface noise, while behavior of marine mammals is a consideration for underwater noise.

For underwater noise, the significance criterion for noise impacts to marine species would be:

- A permanent or long term avoidance of the area by marine wildlife
- A temporary or permanent effect on hearing in marine wildlife
- Stranding, organ damage or death of marine wildlife.

4.7.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.7.2 Preferred Alternative

It is unlikely that underwater sound from dredging operations will cause injury to humans and/or fish and wildlife in the project or study area. In addition, the noise levels would not exceed those already occurring in the harbor due to ship traffic or due to existing maintenance dredging. Compared to other activities that generate underwater sound, dredging is within the lower range of emitted sound pressure levels (CEDA 2011). While it is clear that dredging sound has the potential to affect the behavior of aquatic life in some cases, it is very unlikely that dredging-induced sounds will lead to any population level consequences, although harm to individuals should not be overlooked. Temporary loss of normal hearing capabilities could occur if individuals are in the immediate vicinity of a dredger and are exposed for a long time, which is unlikely. The one investigation carried out on grab dredgers indicates that this activity is relatively quiet and that recorded sound levels were just above the background sound at approximately 3,280 feet from the source (Clarke et al. 2002). Detail on noise levels at the surface and below water are presented below.

Surface Noise

The nearest noise sensitive receptors include a residential area along Southshore Avenue and recreation areas (Singing River Yacht Club) located about 1 mile northeast of the project area. Two churches and four schools are located 1.5 to 2 miles northeast of the northern project footprint. All of the noise sensitive land uses are in much closer proximity to industrial facilities operating at the Bayou Casotte Harbor. Depending on the location relative to the port/industrial activities, noise studies at other ports have documented noise levels generated by port activities ranging between 55 and 70 dBA (Port of Los Angeles 2008).

Mechanical dredging operations produce a noise level between 58 and 70 dB at a distance of 50 feet from the operating dredge (EPA 2003). Noise from multiple equipment sources is determined by adding the various noise emission reference levels together ($10^{L1/10} + 10^{L2/10} \ldots$) and then converting the energy levels back to total decibels [10 log ($10^{L1/10} + 10^{L2/10} \ldots$)], where L is the noise emission reference level in dBA for each piece of equipment. Noise attenuates over distance, which is referred to as divergence. A reference noise emission level at 50 feet is adjusted for distance to a particular point or receiver [20 log (50 feet/distance in feet].

Using these equations, a dredge with a noise level of 70 dBA at 50 feet would result in a noise level of about 30 dBA at a distance of 1 mile (i.e., distance between dredging activities and the nearest noise sensitive site). Two dredges operating in close proximity to each other would result in a noise level of 33 dBA at a distance of 1 mile. The attenuation over distance does not consider any additional attenuation caused by characteristics of the noise propagation path, which may cause absorption, diffusion, or shielding of noise. Atmospheric effects, which are highly variable, may also modify attenuation at large distances.

Considering a noise level of 50 dBA (daytime conditions) to 40 dBA (nighttime conditions) common to urban/suburban residential areas, any noise generated by dredging activities would not be noticeable at noise sensitive sites in closest proximity to the project. In addition, any noise occurring from dredging operations would be temporary as the dredging is finished at the location closest to any noise sensitive areas and moves to another area of the Preferred Alternative thus, increasing the distance between the dredge and noise sensitive areas. Considering the relatively short duration of dredging operations, the distance of about 1 mile or greater between dredging operations and the noise sensitive sites, and the exposure to existing noise from the much closer port/industrial activities as well as neighborhood sources (i.e., traffic, common neighborhood activities, etc.), noise impacts from the Preferred Alternative are anticipated to be minor.

Seabirds and shorebirds may be sensitive to noise from dredging operations and ATON relocation activities. The continued presence of birds within the project area despite noise from existing port/industrial operations and previous maintenance dredging activities indicates that birds are tolerant of anthropogenic noise. Birds displaced from potential forage areas by noise from dredging activities are expected to resume normal use of forage areas once the Preferred Alternative is completed.

Bird species using the barrier islands (Petit Bois Island) may be temporarily displaced from potential roosting areas because of project-related dredging operations. Any displacement would be temporary with birds expected to return to normal use of roosting areas as project-related dredging activities move away and ultimately cease following completion of the project. Considering the relatively low noise levels caused by dredging and exposure of birds to noise from previous maintenance dredging, no adverse impacts to bird populations from the Preferred Alternative are anticipated. Refer to Section 4.13.4 (Other Terrestrial Wildlife) and Section 4.14 (Threatened and Endangered Species) for additional discussion on potential impacts to terrestrial or protected species.

A local noise ordinance (Chapter 54, Article 5 of the Pascagoula Code of Ordinances) specifies a timeframe that limits when excessive noise occurring from the operation of heavy construction equipment can occur (6:30 AM to 7:00 PM, Monday through Saturday). The noise ordinance does not specify a decibel level that, if exceeded, would be a violation of the ordinance. Furthermore, the noise ordinance does not establish an allowable noise level for source types such as industrial operations at the Bayou Casotte Harbor which, compared to where dredging activities associated with the Preferred Alternative would occur, are in much closer proximity to noise sensitive sites. Consequently, the Preferred Alternative will not violate any local noise control requirements.

Underwater Noise

Very little research has been completed on the effects of dredging on the behavior of marine life and results are therefore sparse. Some investigations indicate that gray and bowhead whales avoid areas of dredging activity (reviewed by Richardson et al. 1995) and recent research also indicates that harbor porpoises leave areas during sand extraction. The reactions were relatively short term however (CEDA 2011). No information appears available with respect to noise effects on seals or most species of fish.

Dredging operations produce underwater noise levels of 160 dB to 180 dB at a distance of about 3.3 feet from the noise source at frequencies ranging from 10 Hz to 1,000 Hz (NRC 2003) with peak intensity at frequencies between 50 and 500 Hz (Hildebrand 2003). Underwater noise is reported to have a wide variety of effects on marine mammals including temporary avoidance, long-term avoidance, stranding, organ damage, and death (NRC 2005). These responses vary depending on sound intensity, sound frequency, and acoustic sensitivity of the species potentially affected. Different marine species are sensitive to different sound frequencies and propagation of sound through water varies by frequency. Consequently, assessing the significance of a species' response to a noise source is very difficult (NRC 2005). Ranges of underwater noise sources and corresponding noise levels are listed below:

Underwater Noise Source	Noise Level
Explosives	272 dB–287 dB
Pile driving	220 dB–257 dB
Echo sounders	230 dB–245 dB
Low-frequency military sonar	240 dB
Sperm whale click	236 dB
Mid-frequency military sonar	223 dB
Sparkers, boomers chirp sonars	204–230 dB
Harbor porpoise click	205 dB
Shipping (large vessels)	180 dB–190 dB
Trailing suction hopper dredgers	186 dB–188 dB
Cutter suction dredgers	172 dB–185 dB
Construction and maintenance ships	150 dB–180 dB
Drilling	115 dB–117 dB

The Marine Mammal Protection Act (MMPA) establishes underwater noise standards. The MMPA defines harassment as any act of pursuit, torment or annoyance that:

i. has the potential to injure a marine mammal or marine mammal stock in the wild (Level A Harassment), or

ii. has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B Harassment).

The noise standard is 180 dB for Level A harassment, 160 dB for Level B harassment from a noise source causing pulse noise and 120 dB for Level B harassment from a continuous noise source (The Acoustic College Institute 2004). Cutter suction dredgers (172 dB–185 dB) and trailing suction hopper dredgers (186 dB–188 dB) can be louder (Thomsen et al. 2009), although most noises from dredging activities are relatively low in intensity and frequency, and recent investigations indicated that occasionally higher frequencies are emitted. As defined by the MMPA, dredging operations could result in harassment of marine mammal species if the mammals are in close proximity to an operating dredge. However, this would be a temporary condition and the mammals can swim around the disturbance.

Water depth and bottom type also affect the propagation of sound energy. Analysis of sound propagation in shallow waters indicates frequencies at which there is no sound propagation. This is referred to as the “cutoff frequency” (NRC 2003). For soft bottom characteristics and shallow water conditions common to the project area where dredging would occur, the cutoff frequency is about 500 Hz. These conditions would eliminate propagation for a substantial portion of the noise generated by dredging operations associated with the Preferred Alternative.

Response to noise is also influenced by the species that would be exposed to project-related noise. Whales known to occur in the Gulf of Mexico include finback and humpback whales. These whales hear best at frequencies between 80,000 and 150,000 Hz (NRC 2005). Because the highest frequency associated with dredging noise is about 1,000 Hz, it is unlikely that that these whales would be disturbed by the Preferred Alternative.

Other marine species, such as sea turtles and fish, hear at frequencies below 1,000 Hz (NRC 2003). These marine species may be disturbed by noise produced during dredging activities, which could alter behavior. However, these species have historically been exposed to ongoing maintenance dredging operations. Assessing the effects of underwater noise on marine species is difficult because criteria to determine when a significant response may occur are not well established. Considering the limits on propagation of underwater noise for shallow water depths and soft bottom conditions within the project area, the tendency of marine species to avoid anthropogenic noise, and previous exposure to maintenance dredging activities, any noise impacts from the Preferred Alternative are expected to be minor, but would be addressed under ESA permitting with NMFS (Section 4.14, Threatened and Endangered Species).

4.7.3 Alternative 2

Potential noise impacts resulting from Alternative 2 would be the same as those described under the Preferred Alternative in subsection 4.7.2.

4.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES

Impacts related to HTRW would be significant if the proposed channel widening resulted in any of the following:

- creation of a significant hazard (a hazard that is an actual or potential source of serious harm, or harm that occurs over a period of time) to the public or the environment through the transport, use, or disposal of hazardous materials;
- creation of a significant hazard to the public or the environment through reasonably foreseeable accident conditions involving the release of hazardous materials into the environment;
- generate hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school; or
- be located on a site which is included on a list of hazardous materials sites and, as a result, create significant hazard to the public or the environment.

As discussed in Section 3.10, baseline data were collected post-Deepwater Horizon oil spill and compared with data collected pre-spill (EA 2011a, EA 2011b). There were no discernible changes noted in the sediment quality that could be attributed to the Deepwater Horizon Oil Spill (see Appendix B, Dredged Material Management Plan, for detailed results).

4.8.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.8.2 Preferred Alternative

The purpose of the HTRW investigation and the resulting data are to identify indicators of potential hazardous materials or waste issues relating to the study area corridor (Figure 3.8-1). Examination of aerial photographs of the area, which were collected between 1940 and 2007, indicated a petrochemical refinery, chemical, and other industrial (maritime shipping) activities in the northern (land-based) portion of the study area. No other potential HTRW sites were identified in the study area or nearby vicinity in the aerial photography.

Regulatory flight documentation indicates one known hazardous waste site, Chevron Products Company, with potential contamination in the soils and/or groundwater. Chevron is also a RCRA and TRIS site. However, this site has been remediated and long-term post closure monitoring is currently being conducted (EDR 2011). The site is not recorded on the Federal Superfund list or on the National Priority Listing. Five facilities were identified on the SHWS list of facilities (i.e., potential release of hazardous substances into the environment). These SHWS sites have either been remediated or have no further remedial action planned relative to these sites (EDR 2011). None of the SHWS sites are included on the NPL or Superfund Facility Lists.

Although Mississippi State Oil and Gas Board (MSOGB 2011) files indicate a small number of pipeline crossings related to oil and gas exploration in the Gulf, records obtained from Anchor QEA, Chevron Pipeline Company, Fugro Chance, Inc., and the USACE indicate no past pipeline releases in the project area. Contamination from these sources is therefore not anticipated. The most likely contamination that could be expected associated with active oil wells, gas wells, or pipelines would be from leaks or spills of condensate, or distillate, derived from natural gas or hydrocarbon product spills. Because hydrocarbon product will float on the water surface, there is very little potential of contamination to the bottom sediments from this source, or from any other hydrocarbon source such as oil wells, crude oil pipelines, or accidental hydrocarbon product spills. It would be more likely to find hydrocarbon contamination around active wells or pipelines that are located on emergent land. Although there is little potential of encountering contamination from pipelines, the occurrence of pipelines crossing the Bayou Casotte Channel and Lower Pascagoula Channel should be noted in order to take proper measures during proposed channel widening activities.

Based on the findings of the HTRW survey (i.e., no existing sites require cleanup and all former sites have been cleaned up), the probability of encountering contaminated materials or the release of HTRW as a consequence of the Preferred Alternative is low. Even though there is some risk for unregulated releases of hazardous material into Bayou Casotte Harbor in the study area corridor, it is considered minimal. The highest probability of residual contamination in sediments would be in the area of the highest concentration of industrial activity. Based upon the findings from the regulatory data review presented in Section 3.8.1, the probability of encountering contaminated material in these areas is considered low.

In addition, with the laws and regulations that govern the handling of hazardous material, spill abatement, and clean-up requirements, there is a decreased risk of future spills or leaks of hazardous material causing a long-term detrimental impact to the sediments of the project area. However, any activity regarding spills of hazardous material into the waters of the study area corridor and resulting remediation should be monitored through the regulatory agencies.

Based upon the findings from the regulatory data review presented in Section 3.8.1, the Preferred Alternative poses no significant threat to the public or the environment with respect to the transport, use, or disposal of hazardous material at present or in the reasonably foreseeable future. Additional investigations related to HTRW issues are not warranted at this time.

4.8.3 Alternative 2

Potential impacts from HTRW resulting from Alternative 2 would be the same as those described for the Preferred Alternative.

4.9 WATER QUALITY

Disposal of dredged sediments in U.S. waters is allowed provided there is avoidance of "unacceptable effects," compliance with applicable water quality standards after considering dispersion and dilution, toxic effluent standards, and marine sanctuary requirements, and no jeopardy to endangered species (Section 404 Federal Water Pollution Control Act [PL 92-500]). Therefore violation of any of these standards is considered an adverse impact to water quality. Potential impacts of water quality constituents of concern, specifically salinity, DO, TSS, nutrients, bacteria, and various metals and pesticides, are addressed here.

The fate of these pollutants is affected by currents, flows, and other physical and chemical factors, all of which are directly addressed in sections 3.3, Bathymetry, and 3.4, Hydrodynamics.

4.9.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts to temperature, salinity, DO, or TSS are anticipated, as no new activities would occur (maintenance dredging would continue).

Similarly, no additional impacts to nutrient levels (nitrogen, phosphorous and associated impact(s) on chlorophyll-*a*) are anticipated under the No-Action Alternative.

Under the No-Action Alternative, no additional impacts to levels of metals, PAHs, PCBs, chlorinated pesticides, and dioxin and furan congeners are anticipated.

No additional impacts to bacteria levels are expected under the No-Action Alternative. Under existing conditions, bacteria levels for recreational and fish and wildlife violate state standards in the project area at the two stations where coliform levels are measured (MDEQ 2011).

4.9.2 Preferred Alternative

Water Temperature, Salinity, Dissolved Oxygen, and Total Suspended Solids

Temporary and minor effects on temperature profiles are expected during the dredging operations and for a short period of time after dredging operations have been completed due to water column mixing. Temperature variants once dredging is complete will be the same as those within the previously dredged channel area and result in permanent effects based on the correlation between water depth and temperature (USACE 2010).

The proposed channel will be larger than the existing channel, thereby increasing the volume of saltwater entering Bayou Casotte from the Gulf and potentially reducing the dilution effect of the freshwater from Bayou Casotte on salinity in Mississippi Sound. Effects of altered salinity gradients may be most evident among the early life history stages of both invertebrates and fish, which can be particularly sensitive to salinity alterations (i.e., James et al. 2003, Kefford et al. 2007). Deepening an estuarine channel can alter the degree and form of estuarine mixing as the extent of mixing of fresh waters and salt waters in estuaries is dependent, in part, on channel bathymetry, fluvial and tidal energy, substrate roughness, and other lesser factors (USACE 2009a).

Waters in this portion of the Mississippi Sound are stratified, i.e., lower density freshwater flows across the top of higher density saline waters at the bottom of the channel, and fresh and salt water mix only in a transition zone and the vertical stratification important to local biota is maintained. Therefore, no adverse impacts in the freshwater-saltwater mixing zone in this stratified system are anticipated.

State standards for DO are that a daily average from a sample location should not fall below 5.0 mg/L, and that instantaneous readings should not fall below 4.0 mg/L (MDEQ 2007). Additionally, it is recommended (MDEQ 2007) that the measurement depth be determined based on where stratification layers (whether from temperature or salinity) exists. For those coastal waters which are stratified, DO measurements should be collected when possible from the mid-depth of the epilimnion if the epilimnion depth is 10 feet or less or at 5 feet from the water surface if the epilimnion depth is greater than 10 feet (MDEQ 2007). Based upon these guidelines, the MDEQ criteria do not require DO measurements from the bottom waters, in part because existing guidance (MDEQ 2007) is to measure DO levels in the water mass of stratified water bodies (the surface layer) where DO levels would be highest, while not sampling in the water mass (the bottom layer) where problematic levels of DO most commonly occur. Effects on DO levels in shallow waters are for the most part expected to be minor and temporary. Temporary effects of the dredging operations will be limited to the mixing of water with bottom sediments, resulting in increased chemical and biological oxygen demand (USACE 2010).

Effects on TSS due to the Preferred Alternative are anticipated to be temporary and would be restricted to periods of dredging operations. The use of appropriate turbidity control measures for the project will help to control turbidity by keeping it to a minimum and within the immediate dredging area. Data do not indicate a correlation between TSS levels and depth, therefore widening the channel to the depth of the existing channel is not expected to permanently impact TSS levels.

Nutrients and Bacteria

Based on elutriate sampling (USACE 2010), the Preferred Alternative is expected to result in un-ionized ammonia values that exceed both the chronic (0.035 mg/L) and acute (0.233 mg/L) guidance criteria levels used in the Bayou Casotte TMDL (EPA 2007a). The TMDL guidance criteria were in turn based on saltwater criteria for ammonia that were originally established by the EPA (1989). Results from elutriate testing from the channel indicated the highest ammonia concentrations were 0.33 mg NH_3/L, 42 percent higher than the acute effects level. However, dilution of sediment port waters with a water volume 1.7 times greater would reduce ammonia concentrations to below acute criteria. For chronic criteria, pore water ammonia values (0.33 mg NH_3/L) would be compared to the chronic criteria threshold of 0.035 mg NH_3/L. The highest porewater ammonia level sampled was approximately 9.4 times higher than the chronic criteria levels of 0.035 mg NH3/L (EPA 1989). Therefore, if the total volume of porewater has ammonia levels similar to the highest concentration sampled, the chronic criteria threshold would be exceeded in overlying waters only if the porewater volume was mixed with less than ten times its own volume.

Results of modeling conducted as part of the MPRSA Section 103 Evaluation to address transport and placement of dredged material for this project indicated a 318-fold dilution of full strength elutriate concentration would be expected within 4 hours following placement of dredged material at the ODMDS and is more than adequate for meeting guidance criteria levels in the Bayou Casotte TMDL (USACE 2012) for both ammonia and dissolved cyanide.

Standard elutriate samples for Bayou Casotte included a single exceedance of acute criterion guidance for dissolved cyanide, which was approximately 1.6 times higher than acute and chronic criteria levels (which are the same; Anchor QEA 2012). The 318-fold dilution of the elutriate concentrations (expected within 4 hours of placement of dredged material at the ODMDS [USACE 2012]) provides adequate dilution to achieve guidance criteria levels for dissolved cyanide.

The absence of correlation between depth and nutrient levels suggests that an increase in depth in the project area will not lead to permanent effects on nutrient levels in bottom waters.

Under the Preferred Alternative, an addition 3.4 mcy of sediments will be dredged and placed at the LZA and ODMDS. Impacts to water quality due to bacteria levels are expected to be minor and limited to the duration of the dredging activities. In keeping with the language and intent of the State of Mississippi Antidegradation Implementation Methods (MDEQ 2010) the proposed activity will not "... be degraded below (or above) the base levels set forth in these standards for the protection of the beneficial uses ... The conclusion as to the lack of degradation is based on a comparison of the appropriate existing water quality standard, elutriate concentrations of the same parameter(s), and the amount of dilution of sediment porewaters expected to occur at the disposal site.

Metals, PAHs, PCBs, Chlorinated Pesticides, and Dioxin and Furan Congeners

Based on USACE 2010 elutriate testing, Bayou Casotte elutriate samples included dissolved nickel levels that exceeded the chronic criteria thresholds in one instance, and dissolved copper in three elutriate samples exceeded chronic and acute criteria thresholds (Table 3-3 in Anchor QEA 2012). However, elutriate (pore water) concentrations for nickel and copper exceeded both guidance criteria by factors less than 8-fold. The 4-hour, 318-fold dilution factor for the elutriate concentrations associated with placement of dredged material at the ODMDS provides adequate dilution to meet both acute and chronic criteria thresholds (i.e., EA Engineering, Science and Technology 2011) for both nickel and copper.

The 4-hour, 318-fold dilution factor for the elutriate concentrations associated with dredged material placement at the ODMDS provides adequate dilution to meet both acute and chronic criteria thresholds (i.e., USACE 2012) for both nickel and copper. Comparative studies using the bay mussel *Mytilus edulis* suggest that harbor-related activities can be as important a source as coastal wastewater discharges in the contamination of nearshore marine ecosystems (Young et al. 1979). Therefore, vessel associated contamination would continue under the Preferred Alternative, consistent with the present level of vessel activities.

A single instance of exceedance of chronic water quality criterion for 4,4'-DDT was found in the elutriate samples (Anchor QEA 2012). The criterion threshold of 0.001 μg/L was exceeded by a factor of 6.7. Endrin concentrations in elutriate samples (i.e., porewater) exceeded chronic water quality criteria guidance by a factor of 3.4, while two instances were found where heptachlor in elutriate samples exceeded EPA chronic water quality criteria thresholds, by factors of 2.0 and 6.7 (Anchor QEA 2012). The 4-hour, 318-fold dilution of full strength elutriate concentrations following dredged material placement at the ODMDS will provide adequate dilution to meet chronic criteria thresholds (i.e., EA Engineering, Science and Technology 2011). These contaminants did not exceed higher acute criteria thresholds. These data and analyses indicate no adverse impacts from these contaminants are expected as a result of the Preferred Alternative. In keeping with the language and intent of the State of Mississippi Antidegradation Implementation Methods (MDEQ 2007) the proposed activity will not cause water quality to be "... degraded below (or above) the base levels set forth in these standards for the protection of the beneficial uses . . . The conclusion as to the lack of degradation is based on a comparison of the appropriate existing water quality standard, elutriate concentrations of the same parameter(s), and the amount of dilution of sediment porewaters expected to occur at the disposal site.

4.9.3 Alternative 2

Water Temperature, Salinity, Dissolved Oxygen, and Total Suspended Solids

Impacts to temperature, salinity, DO, and TSS under Alternative 2 will be the same as those in the Preferred Alternative.

Nutrients and Bacteria

Nutrient effects under Alternative 2 will be the same as those in the Preferred Alternative.

Impacts to water quality due to bacteria levels are expected to be the same as those described for the Preferred Alternative.

Metals, PAHs, PCBs, Chlorinated Pesticides, and Dioxin and Furan Congeners

Effects on metals, PAHs, PCBs, chlorinated pesticides, and dioxin and furan congeners are expected to be the same in Alternative 2 as they are described for Preferred Alternative.

4.10 SEDIMENT QUALITY

Channel sediment pollutants (e.g., heavy metals, organics including pesticides, PCBs, nutrients) from municipal, industrial, and agricultural practices are sources of concern with respect to potential water quality contamination from dredging and disposal of the sediments. Studies by the USACE in the 1970s indicate that adverse impacts to water quality, aquatic organisms or other beneficial uses of water bodies are not anticipated from open-water disposal of dredged sediment, although confined disposal could affect water quality due to the release of heavy metals and some other pollutants from surface and ground waters (Jones-Lee and Lee 2005). The DMRP studies and subsequent studies also reaffirmed that the concentration of contaminants in sediments does not predict the potential for contaminant release from sediments during or after disposal.

The suitability of sediments for ocean disposal requires a four tiered evaluation process:

- Tier 1 – Evaluation of Existing Information
- Tier 2 – Use of Conservative Screening Tools for Evaluating Potential Impacts
- Tier 3 – Laboratory Bioassays
- Tier 4 – Advanced Biological Evaluations

Based on physical and chemical characterization of bottom sediments, the bottom sediments in the area to be dredged are expected to have a high silt and clay content (Anchor QEA 2012). In contrast, the ODMDS has lower levels of silt and clay. As a result, the physical characteristics of the sediments to be deposited in the ODMDS are such that Tier 2 and Tier 3 evaluations were conducted.

4.10.1 No-Action Alternative

Metals

No additional impacts to metals are anticipated under the No-Action Alternative.

Pesticides and Other Contaminants

No additional impacts to levels of chlorinated pesticides, dioxin and furan congeners, SVOCs, and butyltins are anticipated under the No-Action Alternative.

4.10.2 Preferred Alternative

Metals

Five instances were found where arsenic in sediments exceeded TELs with exceedances ranging between a factor of 1.1 and 1.5 (Table 3-2 in Anchor QEA 2012). However, arsenic levels did not exceed Probable Effects Level (PEL) guidance criteria.

Bioaccumulation evaluation was performed with two test organisms, the sand worm (*Nereis virens*) and the blunt-nose clam (*Macoma nasuta*). These two organisms were exposed to sediments from the area to be dredged for 28 days, and survival rates and mean tissue concentrations were compared to results from laboratory controls and sediments from a reference site (with no evidence of contamination). Survival rates did not differ between organisms or between dredged and reference sites (Anchor QEA 2012). Tissue concentrations of arsenic, copper, and lead from these test organisms were tested against USFDA "Action Levels" and also EPA Region 4 "background tissue concentration" data. None of the metals concentrations in tissues exceeded FDA Action Levels, but lead levels in clams exceeded concentrations in the EPA Region 4 background tissue concentration data set. The lead content of clam tissues raised on sediments from the areas to be dredged was also higher than for clams raised on sediments from the reference site (Anchor QEA 2012).

Prior to placement of dredged material, concurrence by the EPA will be obtained regarding guidance for the Limiting Permissible Concentration (LPC) for lead in sediments. As described in Appendix B, sediment testing using established EPA standards concluded that project materials will not result in unacceptable bioaccumulation and would be acceptable for disposal at the ODMDS, consistent with EPA criteria for evaluation of potential contaminant-related environmental impact of the ocean disposal of dredged material. EPA concurrence is anticipated by September 15, 2012.

Pesticides and Other Contaminants

Levels of chlorinated pesticides in sediments did not exceed TEL guidance criteria for samples in Bayou Casotte (Anchor QEA 2012).

Bioaccumulation evaluation was performed with two test organisms, the sand worm (*Nereis virens*) and the blunt-nose clam (*Macoma nasuta*). These two organisms were exposed to sediments from the area to be dredged (test area) for 28 days, and their survival rates and mean tissue concentrations were compared to results from laboratory controls and sediments from a reference site (with no evidence of contamination). Survival rates for individuals grown on sediments from the test did not display survival rates different from controls or reference sites (Anchor QEA 2012). Tissue samples from these organisms were compared to U.S. Food and Drug Administration (USFDA) "Action Levels" as well as Toxicity Equivalency Quotient (TEQ) criteria. Also, values were tested against the EPA Region 4 "background tissue concentration" dataset. No samples exceeded USFDA Action Level criteria, but dioxin TEQ values for both worms and clams exceeded EPA background concentrations in both test and reference sites. Anchor QEA (2012) found that the exceeded dioxin TEQ values for organisms on the reference site sediments were attributable to the least toxic congener, indicating little likelihood of adverse impacts of dioxin congeners in sediments.

Prior to placement of dredged material, concurrence by the EPA will be obtained regarding guidance for the LPC for dioxin congeners sediments. As described in Appendix B, sediment testing using established EPA standards concluded that project materials will not result in unacceptable bioaccumulation and would be acceptable for disposal at the ODMDS, consistent with EPA criteria for evaluation of potential contaminant-related environmental impact of the ocean disposal of dredged material. EPA concurrence is anticipated by September 15, 2012.

The USACE tested sediments for 46 SVOCs, of which five [bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, diethyl phthalate, di-n-butyl phthalate, and phenol] were detected at low concentrations in sediment samples from areas to be dredged. In comparison, there were no SVOCs detected at either of the reference sites. One of the 46 SVOCs [bis(2-ethylhexyl) phthalate] has a TEL and PEL value for comparison and one of the detected concentrations of bis(2-ethylhexyl) phthalate (at BCW-05) was above the TEL criteria (USACE 2011e). The TEL of this phthalate compound exceeded TEL criteria by a factor of 2.4 (Anchor QEA 2012).

Butyltins were not detected in the sediments, and therefore, did not exceed existing sediment criteria (Table 3-2 in Anchor QEA 2012).

Prior to placement of dredged material, concurrence by the EPA will be obtained regarding guidance for the LPC for SVOC in sediments. As described in Appendix B, sediment testing using established EPA standards concluded that project materials will not result in unacceptable bioaccumulation and would be acceptable for disposal at the ODMDS, consistent with EPA criteria for evaluation of potential contaminant-related environmental impact of the ocean disposal of dredged material. EPA concurrence is anticipated by September 15, 2012.

4.10.3 Alternative 2

Metals

Effects on Metals will be the same under Alternative 2 as they are under Alternative 1.

Pesticides and Other Contaminants

Levels of PAH, PCB congeners in sediments did not exceed TEL guidance criteria for any samples within Bayou Casotte (Anchor QEA 2012). Therefore, no impacts are anticipated and PAHs were not examined further.

Levels of chlorinated pesticides, dioxin, furan congeners, SVOCs, and butyltins will be the same under Alternative 2 as they are under the Preferred Alternative. Therefore, potential impacts of dredged sediments on placement sites would be the same under Alternative 2 as described for the Preferred Alternative.

4.11 FRESHWATER AQUATIC, WETLAND, AND TERRESTRIAL PLANT COMMUNITIES

Vegetation communities that occur in the proposed project area are almost exclusively estuarine and marine deepwater and wetland habitats: less than one percent of the project area includes freshwater wetlands. The estuarine and marine habitats in the Mississippi Sound in the vicinity of the proposed project include habitats associated with open water, the LZA and ODMDS sites, such as natural and anthropogenic islands, barrier beaches and SAV. Vegetation communities described in Section 3.11 that are not found within the project area have been excluded from a discussion of potential impacts to the resource and are, therefore, not presented. Marine aquatic communities are presented in Section 4.12.

4.11.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.11.2 Preferred Alternative

Mainland anthropogenic, mainland natural, and barrier islands beaches. Approximately 3.7 percent of the estimated 3.4 mcy of dredged sediments are appropriate for beneficial use placement in the LZA proximity to the southeast portion of Horn Island under the Preferred Alternative. Therefore, benefits to the islands and barrier drifts are anticipated. Mainland anthropogenic, mainland natural and barrier island beaches are absent from the Preferred Alternative footprint and the Pascagoula ODMDS site designated for disposal of dredged material. The LZA disposal site is located in close proximity to the southeast portion of Horn Island; any impacts are considered beneficial to the island and near shore areas due to the natural east-to-west littoral drift of sandy material placed in the zone. No direct or indirect impacts to vegetation present on the island associated with construction are anticipated.

Submersed aquatic vegetation. According to NOAA (2011b), approximately 652 acres of SAV occurs within the study area on the north shorelines of the barrier islands (Figure 3.11-2). No SAV is apparent in the Preferred Alternative footprint, LZA, or Pascagoula ODMDS sites designated for placement of dredged material. No direct impacts associated with construction are anticipated. Impacts to isolated plants or small unmapped patches in other areas could occur during dredging and/or placement, but this is unlikely. Consequently, no adverse impacts to SAV populations are anticipated as a result of the Preferred Alternative.

4.11.3 Alternative 2

Channel widening proposed under Alternative 2 would result in impacts similar to those described for the Preferred Alternative. However, under Alternative 2, approximately 9.6 percent of an estimated 3.3 mcy of beneficial use material would be placed in the LZA and would help to nourish the westerly littoral drift in the Sound, resulting in environmental benefits. The volume of placement under Alternative 2 represents an estimated 190,000 cy more beneficial use for littoral drift nourishment when compared with the Preferred Alternative.

4.12 MARINE AQUATIC COMMUNITIES

There are no state or Federal measureable criteria for defining significant impacts to the quality and/or quantity to aquatic communities, fisheries, and EFH. The assessment of potential impacts to aquatic communities, fisheries, and EFH is based on scientific literature. For this evaluation, temporary and long-term impacts to aquatic communities, fisheries, and EFH are presented. Temporary impacts would be impacts occurring during project construction, potentially lasting for weeks to months following completion of the proposed project and long-term impacts would last months to years following construction of the proposed project.

4.12.1 Open-Water Communities

4.12.1.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.12.1.2 Preferred Alternative

Turbidity in estuarine and coastal waters is generally credited with having a complex set of impacts on a wide array of organisms (Hirsch et al. 1978, Stern and Stickle 1978, Wright 1978, Wilber et al. 2005). Mississippi Sound's characteristically brownish appearance comes from the high sediment load entering the system, which produces elevated turbidity levels (USACE 2011a). The release of sediment during dredging increases turbidity in the water column which creates a sediment plume, the extent of which is determined by the direction and strength of the currents and winds and the particle size of the material released. Suspended material can play both beneficial and detrimental roles in aquatic environments. Turbidity from TSS tends to interfere with light penetration and thus reduce photosynthetic activity by phytoplankton and algae (Wilber and Clarke 2001). Such reductions in primary productivity would be localized around the immediate area of the dredging and placement operations and would be limited to the duration of the plume at a given site. Conversely, the decrease in primary production, presumably from decreased available light, has been found to be offset by an increase in nutrient content which are released into the water column during dredged material placement activities (Morton 1977, Newell et al. 1998). These nutrients may act to enhance the area surrounding the dredging activities increasing productivity. In past studies of impacts of dredged material placement from turbidity and nutrient release, the effects are both localized and temporary (May 1973). Thus, due to the capacity and natural variation in phytoplankton and algal populations, the impacts to phytoplankton and algae from dredged material placement within the project area would be temporary.

Reduced light penetration due to turbidity may have a short term impact on zooplankton populations since they feed on the phytoplankton (Armstrong et al. 1987, Valiela 1995). Such reductions would be localized around the immediate area of dredging and placement operations. Impacts to zooplankton from dredged material placement within the project area would be temporary.

Teeter et al. (2003) found that the area of high turbidity extended roughly to the edge of the fluid mud flow, or about 1,300 to 1,650 feet from the dredge discharge pipe. Modeling of dredged material discharge in the Laguna Madre, Texas, determined that turbidity caused by dredging was short lived and therefore impacts to the estuarine and offshore water column would be minimal (Teeter et al. 2003). Elevated turbidities during dredging and placement activities may affect some aquatic organisms near the dredging activity; turbidities can be expected to return to near ambient conditions within a few hours after dredging ceases or moves out of a given area. Increased sedimentation can impact juvenile and adult finfish by disrupting foraging patterns reducing feeding and feeding rates, and loss of habitat for feeding and reproduction; however, these would be temporary only during project construction (Newcombe and Jensen 1996, Clarke and Wilber 2000). The gills of juvenile and adult finfish can become coated with fine particles hindering gas exchange with the water and could ultimately result in asphyxiation (Clarke and Wilber 2000, Wilber and Clarke 2001). However, finfish and shellfish are motile enough to avoid highly turbid areas and under most conditions, finfish and other motile organisms are only exposed to localized suspended-sediment plumes for short durations (minutes to hours) (Clarke and Wilber 2000, Wilber and Clarke 2001, Newcombe and Jensen 1996).

Effects of elevated turbidities on the adult stages of various filter-feeding organisms such as oysters, copepods, and other species include depression of pumping and filtering rates, clogging of filtering mechanisms therefore interfering with ingestion and respiration, and abrasion (Newcombe and Jensen 1996, Wilber and Clarke 2001, Stern and Stickle 1978). These effects tend to be more pronounced when TSS concentrations are greater than 100 mg/L, but are apparently reversible once turbidities return to ambient levels (Newcombe and Jensen 1996). Research has shown that the more sensitive species and life stages (i.e., eggs, larvae, and fry) are more negatively impacted by longer duration of exposure to suspended sediments (Germano and Cary 2005, Wilber and Clark 2001, Wilber et al. 2005, Newcombe and Jensen 1996). Many crustaceans (such as shrimp and crabs) are not impacted by elevated suspended sediments since these organisms typically reside on or near the bottom where sedimentation naturally occurs (Wilber and Clark 2001, Wilber et al. 2005). Furthermore, turbid waters may actually provide a refuge for these species from being preyed upon by estuarine fish (Wilber and Clarke 2001). Notwithstanding the potential harm to some individual organisms, no long-term impacts to finfish or shellfish populations are anticipated from dredging and placement activities associated with the Preferred Alternative compared with the existing condition.

In the unlikely event of a petroleum product spill, adult crustaceans, such as shrimp and crabs, and adult finfish are probably motile enough to avoid most areas of high oil concentration. Larval and juvenile finfish and shellfish tend to be more susceptible to oil than adults and could be affected extensively by an oil spill during their active immigration periods. Due to their lack of mobility, they are less likely to be able to avoid these areas and could be negatively impacted if a spill were to occur. Phytoplankton, algae, and zooplankton may be adversely affected by oil spills; however, the overall impact of an oil spill may be reduced due to their inconsistent distribution and high rate of propagation (Kennish 1992). An oil spill in the study area could result in impacts to phytoplankton, algal, and zooplankton. However, since these organisms have the ability to recover rapidly from a spill, due primarily to their rapid rate of reproduction and to the widespread distribution of dominant species, significant, long-term impacts would not be expected.

4.12.1.3 Alternative 2

Potential impacts to open-water communities resulting from Alternative 2 would be the same as those described for the Preferred Alternative.

4.12.2 Benthic Communities

4.12.2.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.12.2.2 Preferred Alternative

The Preferred Alternative would result in permanent conversion of 87.6 acres of shallow, primarily silty clay soft bottom habitats to deeper, hypoxic habitat. It would alter the benthic habitat through dredging and placement activities. Excavation buries and removes benthic organisms, whereas placement smothers or buries benthic communities. Dredging and placement of dredged material may cause ecological damage to benthic organisms in three ways: (1) physical disturbance to benthic ecosystems; (2) mobilization of sediment contaminants, making them more bio-available; and (3) increasing the amount of suspended sediment in the water column (Montagna et al. 1998). Dredging can result in a reduction of species diversity by 30 to 70 percent, the number of individuals by 40 to 95 percent, and a similar reduction in the biomass of benthic fauna existing within the boundaries of dredged areas (Newell et al. 1998).

Recolonization of areas impacted by dredging and dredged material disposal occurs through vertical migration of buried organisms through the dredged material, immigration of postlarval organisms from the surrounding area, larval recruitment from the water column, and/or sediments slumping from the side of the dredged area (Bolam and Rees 2003, Newell et al. 1998). The response and recovery of the benthic community from dredged material placement is affected by many factors including environmental (e.g., water quality, water stratification), sediment type, and frequency and timing of disposal. Communities in these dynamic ecosystems are dominated by opportunistic species tolerant of a wide range of conditions (Bolam et al. 2010, Bolam and Rees 2003, Newell et al. 2004, Newell et al. 1998). Although changes in community structure, composition, and function may occur, these impacts are temporary in some dredging and disposal areas (Bolam and Rees 2003). Shallower, higher energy estuarine habitats can recover as fast as 1 to 10 months from perturbation while deeper, more-stable habitats, which can take up to 8 years to recover (Bolam et al. 2010, Bolam and Rees, 2003, Newell et al. 1998, Sheridan 1999, Sheridan 2004, Wilber et al. 2006, VanDerWal et al. 2011). If the bottom waters are hypoxic within the dredged channel area, the dredged area bottom will not be as productive as the shallow bottom.

Maurer et al. (1986) demonstrated that many benthic organisms were able to migrate vertically through 35 inches of dredged material; however, species present in early successional stages of recovery are not the same as those buried by the dredged material. Although vertical migration is possible, most organisms at the center of the disturbance do not survive, and survivability was shown to increase as distance from the disturbance increased (Bolam and Rees 2003, Maurer et al. 1986). The release of nutrients during dredging may also enhance species diversity and population densities of benthic organisms outside the immediate dredge placement area as long as the dredged material is not contaminated (Newell et al. 1998).

The impact to benthic organisms is likely to be confined to the immediate vicinity of the area dredged (Newell et al. 1998) and recovery of benthic macroinvertebrates following burial is typically rapid (recovering within months rather than years) (VanDerWal et al. 2011, Wilber et al. 2006, Wilber and Clarke 2001) and no long-term impacts are expected in disposal areas. However, 87.6 acres of benthic habitat will be removed from the dredged portion of the channel and recovery will be limited to sediment placement areas and the shallower portions of the dredged channel that are not hypoxic. Because of the constant recreation of "new" habitat via disturbance, new recruits continually settle and grow, although communities are dominated by small, surface-dwelling organisms with high growth rates. Consequently, dredged material placement from the Preferred Alternative may result in a shift in community structure rather than a decrease in production (Bolam and Rees 2003, Montagna et al. 1998).

4.12.2.3 Alternative 2

Potential impacts to benthic communities resulting from Alternative 2 would be the same as those described for the Preferred Alternative.

4.12.3 Offshore Sands

4.12.3.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.12.3.2 Preferred Alternative

The Preferred Alternative would result in the burial of bottom habitat at the LZA and ODMDS sites; however, the area involved is a small fraction of the total available habitat in the study area. In addition, both the LZA and ODMDS sites are approved and active sites for maintenance dredging material placement.

Water column turbidity would increase during the disposal of dredged material. Such effects are usually temporary and local and can be expected to return to near-ambient conditions within a few hours after dredging ceases or moves out of a given area (Newcombe and Jensen 1996, Clarke and Wilber 2000), as described in Section 4.12.1.2. At both sites, benthic organisms would be buried and survivorship would be expected to be low during placement of the construction dredged material; however, rapid recolonization will begin to occur in months after the placement of dredge material (Bolam et al. 2010, Bolam and Rees, 2003, Newell et al. 1998, Sheridan 1999, Wilber et al. 2006, VanDerWal et al. 2011). Repeated placement of maintenance material at both sites would bury benthic organisms, and colonies may not fully recover before the next dredging cycle, resulting in a shift in community structure rather than a decrease in production (Bolam and Rees 2003, Montagna et al. 1998). Refer to subsection 4.12.2.2 for a more-detailed discussion of impacts to benthic communities. However, both sites are currently active, thus conditions would not change from what currently occurs.

4.12.3.3 Alternative 2

Potential impacts to offshore sands resulting from Alternative 2 would be the same as those described for the Preferred Alternative.

4.12.4 Artificial Reefs

4.12.4.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.12.4.2 Preferred Alternative

The one offshore and five nearshore artificial reefs in the study area are located approximately 1.5 to 4 miles from the Preferred Alternative (MDMR, 2011b and 2011c), and therefore, no long-term impacts from project construction are anticipated due to their distance from the Preferred Alternative. Although water column turbidity is not expected to extend to that distance during project construction and associated maintenance dredging (Teeter et al. 2003), they would be temporary and motile organisms are mobile enough to avoid highly turbid areas (Clarke and Wilber 2000; Wilber and Clarke 2001; Newcombe and Jensen 1996). See Section 4.12.1.2 for a more-detailed discussion of impacts to open-water communities.

4.12.4.3 Alternative 2

Potential impacts to artificial reefs resulting from Alternative 2 would be the same as those described for the Preferred Alternative.

4.12.5 Invasive Species in Ballast Water

4.12.5.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue and the number of LNG vessels would not increase).

4.12.5.2 Preferred Alternative

Under the Preferred Alternative, fewer LNG vessels would have to be diverted to other ports. The USCG mandatory ballast water management protocols (33 C.F.R. 151 subparts C and D) would remain in place and all vessels, foreign and domestic, equipped with ballast water tanks that operate within U.S. waters would continue to be required to comply with the protocols. No increase in vessel traffic is anticipated from the Preferred Alternative, therefore no changes are anticipated.

4.12.5.3 Alternative 2

Like the Preferred Alternative, fewer LNG vessels would be diverted under Alternative 2. USCG protocols are expected to continue to be used to manage invasive species issues related to ballast water. Under Alternative 2, no increased impacts due to invasive species from ballast water exchanges are anticipated.

4.13 FISH AND WILDLIFE

4.13.1 Essential Fish Habitat

4.13.1.1 No-Action Alternative

Under the No-Action Alternative, designated EFH would remain as described in subsection 3.13.1. Impacts from current maintenance dredging include temporary increases in water column turbidity during and for a short time after dredging and burial of benthic organisms at the LZA and ODMDS sites (Newcombe and Jensen 1996; Clarke and Wilber 2000). Recovery of benthic macroinvertebrates following burial is typically rapid (recovering within months rather than years) (VanDerWal et al. 2011, Wilber et al. 2006, Wilber and Clarke 2001) and, consequently, no long-term effects are expected.

4.13.1.2 Preferred Alternative

The study area includes EFH for adult and juvenile brown, pink, and white shrimp, Gulf stone crab, blacknose shark, spinner shark, finetooth shark, bull shark, blacktip shark, Atlantic sharpnose shark, scalloped hammerhead shark, great hammerhead shark, bonnethead shark, cobia, greater amberjack, lesser amberjack, gray snapper, little tunny, king mackerel, and Spanish mackerel and juvenile tiger shark, red snapper, and lane snapper. In addition, EFH in the study area may include estuarine water column, estuarine mud and sand bottoms (unvegetated estuarine benthic habitats), estuarine emergent wetlands, SAV, estuarine and offshore water column, unconsolidated marine water bottoms, and natural structural features. The Preferred Alternative could temporarily reduce the quality of EFH in the vicinity of the study area and some individual species may be displaced.

The Preferred Alternative would result in permanent conversion of 87.6 acres of shallow, estuarine bottom to a hypoxic, deep-water channel habitat and will result in an adverse impact to EFH and to those living marine resources that the shallow-water habitat supports.

Since fish are motile enough to avoid highly turbid areas (Clarke and Wilber 2000), it is anticipated they would temporarily shift their feeding habitat to undisturbed areas until recovery is complete from dredging related TSS. Feeding habits of shrimp would not be impacted since they typically reside on or near the bottom where sedimentation naturally occurs (Wilber and Clark 2001, Wilber et al. 2005). Refer to subsections 4.12.1.2 and 4.12.2.2 for a more-detailed discussion on impacts to the open-water and benthic communities.

Dredging and placement activities are not expected to cause direct mortality to juvenile and adult pelagic finfish since these life history stages are motile and are capable of avoiding highly turbid areas associated with project construction (Clarke and Wilber 2000). Penaeid shrimp use deeper water of the bay as staging area from which they migrate back into the Gulf during certain times of the year (GMFMC 2004). The displacement of juvenile and adult finfish and shrimp during project construction will likely be temporary and individuals should move back into these specific areas once the project is completed. Juvenile and adult finfish and shrimp should experience minimal direct impacts from dredging and placement activities. Juvenile penaeid shrimp may experience negative impacts due to their preference for burrowing in soft muddy areas, although these are usually in association with plant/water interfaces.

Demersal eggs and larval finfish may experience localized increases in physical abrasion, burial, or mortality during dredging and placement activities due to their limited motility and sensitivity to elevated concentrations of suspended sediments (Newcombe and Jensen 1996, Wilber and Clark 2001, Stern and Stickle 1978, Germano and Cary 2005, Wilber et al. 2005). Larvae in the latter stages of development are capable of some motility, which may allow for movement away from dredging and placement activities, minimizing impacts. Predatory fish species that feed on larval stages of federally managed species may be temporarily displaced from the area as a result of dredging and placement activities. Refer to subsection 4.12.1.2 for a more-detailed discussion on impacts to the open-water communities.

Anticipated increases in turbidity may negatively impact the ability of some finfish to navigate, forage, and find shelter (Newcombe and Jensen 1996, Clarke and Wilber 2000); however, these impacts will be short lived (Clarke and Wilber 2000, Wilber and Clarke 2001, Newcombe and Jensen 1996, Teeter et al. 2003). Shrimp spend at least some portion of their life cycle in areas where they are exposed to turbid conditions and are likely able to move from an area when it becomes inhospitable. Many crustaceans (such as shrimp and crabs) are not impacted by elevated turbidities since they typically reside on or near the bottom where sedimentation occurs (Wilber and Clark 2001, Wilber et al. 2005). This area is already turbid due to the wind and currents and finfish, shrimp, and other marine organisms in this area are accustomed to fluctuations in turbidity and should not be substantially affected by the temporary increase in turbidity from the Preferred Alternative. Refer to subsection 4.12.1.2 for a more-detailed discussion on impacts to the open-water communities.

Material to be dredged that is suitable for beneficial use placement is not expected to pose contamination issues with respect to federally managed species (refer to subsection 3.2.3 for sediment constituent contents and to the DMMP in Appendix B for details). Oil or other chemical spills may adversely impact federally managed species, and larval and juvenile finfish could be affected in the event a spill occurs. Larval and juvenile finfish tend to be more susceptible to spills than adults and could be affected extensively by a spill during their active immigration periods. Due to their lack of mobility, they are less likely to be able to avoid these areas and could be negatively impacted if a spill was to occur. Following the Deepwater Horizon oil spill, sediments in the study area were tested for PAHs and no contamination was documented (USACE 2012).

Based on the above discussion, there is the potential for the Preferred Alternative to result in permanent loss of some habitat with the dredging of additional deeper, hypoxic areas. the potential harm of some individual organisms from turbidity-related impacts would be minimal as compared with the existing conditions and would not reduce any populations of federally managed species. No mitigation would be required for these temporary disruptions to federally managed species as these species are motile and avoid areas during dredging and placement activities and would be able to return to the area after these activities are completed (Clarke and Wilber 2000).

4.13.1.3 Alternative 2

Potential impacts to EFH resulting from Alternative 2 would be the same as those described under the Preferred Alternative in subsection 4.13.1.2.

4.13.2 Recreational and Commercial Fisheries

The significance criteria for the commercial and recreational fishing in the vicinity of the study area would be a permanent localized loss of a commercial or sport species or a change in habitat that leads to a change in species composition and long-term changes in revenue for fisheries in the Mississippi Sound.

4.13.2.1 No-Action Alternative

Under the No-Action Alternative there would be no change in existing conditions. Impacts from current maintenance dredging include temporary disruptions in fish distributions and associated disruptions in commercial and recreational fisheries during and immediately following dredging. Impacts to fisheries also include disruptions in fisheries distributions for a short time after placement of dredged material at the LZA and ODMDS. No long-term effects are expected.

4.13.2.2 Preferred Alternative

The Preferred Alternative would temporarily disrupt fish distributions and localized commercial and recreational fishing in the immediate vicinity of dredging and placement activities. The Preferred Alternative would result in permanent conversion of 87.6 acres of shallow, primarily silt and clay soft-bottom habitats to deeper, hypoxic habitat, thus reducing the amount of food and habitat available to some commercial or sport fish species. Temporary impacts to fisheries species and their prey species may occur due to increased turbidity, and degradation of other water quality conditions. During dredging, east-west migration across the project area may be disrupted; however, once dredging operations are completed the fish community would return to the area and commercial and recreational fishing activities would commence. These impacts are expected to be temporary and conditions in the project area should return to pre-construction conditions once the channel is widened. However, a larger area would be characterized by deep hypoxic conditions. Dredging can result in a reduction of species diversity by 30 to 70 percent, the number of individuals by 40 to 95 percent, and a similar reduction in the biomass of benthic fauna existing within the boundaries of dredged areas (Newell et al. 1998).

During placement of dredged material individual fishes may be harmed from smothering or increased turbidity that can clog gills. The majority of fish are expected to move from the vicinity during placement activities. Fishing grounds in other portions of Mississippi Sound will be available to recreational and commercial fishing during the dredging and placement operations; therefore, fishing activities could be conducted at other locations in the Mississippi Sound. Use of most aquatic habitats in dredged and placement areas by recreational and commercial fish species are expected to resume after work is complete. Therefore, no long-term effects are expected. Refer to subsections 4.1.2.1 and 4.12.2.2 for a more-detailed discussion of impacts to open-water and benthic communities.

4.13.2.3 Alternative 2

Impacts to commercial and recreational fishing resulting from the implementation of Alternative 2 would be the same as those described for the Preferred Alternative.

4.13.3 Commercially and Recreationally Important Terrestrial Species

4.13.3.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.13.3.2 Preferred Alternative

No commercially and recreationally important terrestrial species are anticipated to occur within the project area, including the Preferred Alternative and the LZA and Pascagoula ODMDS sites designated for disposal of dredged material. Most of these species, as described in section 3.13.4, occur in wooded habitats and as a result, no direct, indirect, or cumulative impacts associated with construction are anticipated.

4.13.3.3 Alternative 2

Potential impacts to species under Alternative 2 are the same as those described for the Preferred Alternative.

4.13.4 Other Terrestrial Wildlife

4.13.4.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.13.4.2 Preferred Alternative

Numerous avian species are found within the study area (NatureServe 2011). The noise and activity of the Preferred Alternative would likely deter birds from using areas near the vicinity of equipment during operational periods. The motility of birds allows them to avoid the project area. Increased turbidity levels associated with dredging and placement operations could temporarily decrease foraging success of diving and plunging bird species that utilize deepwater areas for feeding; however, subject species are not dependent or limited to the operational site for same. If temporarily displaced, it is expected that plunging and diving birds will shift to alternative foraging habitats readily available in the northern Gulf of Mexico and the Mississippi Sound. Upon completion of dredging and placement operations, normal use of the area by birds is expected to resume and any impacts would be expected to be small, localized, and temporary.

The Preferred Alternative could disrupt resident birds and breeding migrants (e.g., black skimmers, gulls, pelicans, terns, osprey, and heron) on barrier islands. Migratory birds utilizing the barrier islands as a stopover point typically arrive with low reserves of body fat and any disturbance from dredging operations may cause subject migrants to avoid the southeastern portion of Horn Island and the western portion of Petit Bois Island. These migrants would likely seek other nearby areas not affected by the dredging. The peak numbers of migrants occur from mid-April through early May and early September through mid-October (Moore et al. 1990). The LZA is in close proximity to the southeast portion of Horn Island; however, placement of dredged material would occur near shore and not directly on the barrier island. Birds may temporarily avoid the area of the island near the work area, which could temporarily impact nesting and roosting behavior. Upon completion of dredging and placement operations, normal use of the area by birds is expected to resume and any impacts would be expected to be small, localized, and temporary.

It is expected that sand from the LZA will progressively move onto the barrier islands and other nearshore areas (Anchor QEA 2012). Additional sands on the barrier islands would result in more foraging habitat (exposed during lower tides) for the shorebird guild. The additional sands would also increase or sustain the amount of loafing and nesting habitat available. Beneficial use is well documented as providing increased forage, nesting, and loafing sites (Landin 1978, Guilfoyle et al. 2006 and 2007).

4.13.4.3 Alternative 2

Potential impacts to bird species under Alternative 2 would be the same as those described for the Preferred Alternative.

4.14 THREATENED AND ENDANGERED SPECIES

Potential impacts to federally or state-listed threatened or endangered species were evaluated for each of the alternatives. The criteria for assessing significant impacts to threatened and endangered species are:

- Loss of or long-term reduction in a population.
- Habitat modification that causes a permanent disruption to breeding, foraging, or other life history requirements.
- Permanent interference with the movement of native resident or migratory protected species.
- Loss of any areas designated as critical habitat.

4.14.1 Marine Threatened and Endangered Species

Marine threatened and endangered species described in Section 3.14 that are not found within the project area have been excluded from a discussion of potential impacts to the resource and are, therefore, not presented.

4.14.1.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue). Following the completion of ongoing maintenance dredging activities, any displaced animals would be expected to resume normal use of the area. Maintenance dredging would comply with the GRBO for sea turtles and Gulf sturgeon and incidental takes of species would be limited as specified in the GRBO.

4.14.1.2 Preferred Alternative

The majority of impacts to threatened and endangered species anticipated as a result of the Preferred Alternative would be temporary in nature and due to changes to the habitats along migratory routes or feeding habitats. Potential temporary and permanent impacts are described in general below and then discussed with respect to potentially impacted species.

Temporary impacts include:

- Underwater noise caused by dredging and placement activities during construction and maintenance dredging.
- Changes to water quality such as elevated turbidity levels and potential release of contaminants in sediments.
- Changes to predator prey dynamics for benthic feeders (disruption of foraging habitat).

Permanent impacts include:

- Changes in water quality and bottom (potential water column stratification resulting in hypoxic conditions).
- Potential ship strikes.
- Increased competition from invasive species being carried in ballast water.

Mammals

The whale species listed as threatened or endangered that could occur in the vicinity of the study area (finback, humpback, blue whale, sei whale, and sperm whale) typically occur in the deeper waters off the continental shelf and would only venture through the study area as incidental transients. Any impacts to these species would be limited to annoyance and alteration of swimming patterns to avoid the active dredging areas. Following the completion of dredging activities, any displaced animals would be expected to resume normal use of the area.

No whales are anticipated to occur in the project area. Whales are typically found in the Gulf of Mexico and have been shown to be sensitive to vessel strikes and the degree of potential impact is dependent on the amount of increased ship traffic (number of vessels and the trips per year). Along the Gulf of Mexico coast (Texas to the Florida Keys), of the 31 dead whale strandings from 1975 through 1996: only one stranding was identified as a possible ship strike—a sperm whale with propeller wounds found in Louisiana on 9 March 1990 (Laist et al. 2001).

Amphibians and Reptiles

The loggerhead, leatherback, hawksbill, and Kemp's ridley sea turtles may pass through the Mississippi Sound. The study area is not a major location of critical life history requirements for any of these species and any impact of activities associated with the Preferred Alternative and the turtles would be incidental during foraging and subsequent avoidance of active work areas. Following the completion of dredging and placement activities, any displaced animals would be expected to resume normal use of the area. Existing biological opinions on hopper dredging in the U.S. South Atlantic and Gulf of Mexico waters (most recently, January 9, 2007, GRBO to the USACE's four Gulf of Mexico districts) have established that non-hopper type dredging methods have discountable effects on, or are not likely to adversely affect, currently listed sea turtles (I/SER/2006/02953; I/SER/2006/01096). Although the GRBO does not cover widening of the channel if similar equipment is used for dredging; widening the channel would not likely effect sea turtles. Incidental take may result from entrainment by hopper dredging equipment, but this is unlikely for adult sea turtles (based on information in the GRBO). Anticipated impacts to adult sea turtles would be temporary and minor. However, a biological assessment will be submitted to the NMFS Protected Resources Division for the Preferred Alternative. The NMFS will determine whether a negative impact would occur from the Preferred Alternative.

Late juvenile life history stages of sea turtles are benthic and could be captured or entrained by dredging equipment (USACE 1990). NMFS requests that hopper dredging operations occur between December 1 and March 31, whenever feasible.

Fish

The Gulf sturgeon migrates through the Mississippi Sound and may occur in the Sound at any time, but is more likely to occur in fall and winter (October–March). The Gulf sturgeon feeds on benthic organisms and could be captured or entrained by dredging and placement activities. Gulf sturgeon occurs regularly in the study area, but the impacts would be expected to be limited to incidental contact during foraging and subsequent avoidance of active work areas. Widening of the Pascagoula Harbor Navigation Channel would occur north of the barrier islands, which is within the Gulf sturgeon critical habitat. The widening would result in permanent conversion of 87.6 acres of shallow, primarily silty clay soft-bottom habitats to deeper, hypoxic habitat, which will result in an adverse impact to living marine resources that the shallow-water habitat supports, including prey species of the Gulf sturgeon. Water stratification and hypoxic conditions will most likely result in less-productive bottom conditions within the dredged area. Following the completion of dredging and placement activities, any displaced animals would be expected to resume normal use of the placement area after some period of recovery time. Incidental mortality could result from entrainment by dredging equipment, and could result in large population reductions because of the reduced population size following Hurricane Katrina. The GRBO will not cover activities of the Preferred Alternative due to the fact that it will be widening the existing channel. The USACE will consult with the NMFS regarding impacts from the proposed dredging and placement of dredged material to Gulf sturgeon and Gulf sturgeon critical habitat. The NMFS will make the determination of whether a significant impact would result from the Preferred Alternative.

Alabama shad are sensitive to changes in water conditions, particularly turbidity and dissolved oxygen, and use the project area in the fall and winter. However, the shad would avoid the area during dredging and dredged material placement activities and return once conditions normalize. Therefore, no adverse impacts to this species are anticipated.

4.14.1.3 Alternative 2

Potential impacts to threatened and endangered marine species resulting from implementation of Alterative 2 would be the same as those described for the Preferred Alternative.

4.14.2 Terrestrial Threatened and Endangered Species

Terrestrial threatened and endangered species described in Section 3.14 that are not found within the project area have been excluded from a discussion of potential impacts to the resource and are, therefore, not presented.

4.14.2.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.14.2.2 Preferred Alternative

Amphibians and Reptiles

Aquatic habitats that support the yellow-blotched map turtle are found outside of the proposed dredge areas and are beyond the range of impacts of the Preferred Alternative and would have no effect on this species.

The Alabama red-bellied turtle is the only listed reptile known to occur in the study area and occurs on Horn Island. This species is highly mobile and would likely not be affected by the proposed dredging. Increased activity in the area as a result of the Preferred Alternative will be temporary and would not likely disrupt the normal behavior patterns of this species. Any areas selected for beneficial use of dredged material would be surveyed to determine both species presence and nesting locations occurring within these areas. Therefore no adverse impacts to this species are anticipated.

Mammals

The West Indian manatee is known to migrate through the project area between Florida and Louisiana. Active dredging and placement activities may disturb these animals and cause them to alter their route, due to underwater noise from construction activities, and elevated turbidity levels. These temporary impacts would likely cause the manatee to avoid the project area but would not prevent their passage across the study area. A letter from USFWS (received on November 21, 2011) stated that the USACE has BMPs for dredging activities that should provide adequate measures to prevent impacts to this species.

Birds

Protected bird species anticipated to be within an affected range from the project area include the piping plover (*Charadrius melodus*), Mississippi sandhill crane, bald eagle (*Haliaeetus leucocephalus*), and brown pelican (*Pelecanus occidentalis*).

The bald eagle, brown pelican, and Mississippi sandhill crane are species that often occur in the nearshore environments of the study area. Effects to foraging and nesting habitats of these species would be temporary as they would only occur during dredging operations. The species are highly mobile and typically avoid dredge areas. Impacts to these species from the Preferred Alternative are anticipated to be temporary and minor.

Horn Island, Round Island, and Petit Bois Islands are federally designated critical habitat for the piping plover. Direct impacts to critical habitat are not expected as dredging would be confined to areas near the existing channel. Impacts to nesting and foraging of the piping plover are expected to be temporary and minor as the impacts would be restricted to the time needed for dredging. Beneficial use of the dredged material may cause temporary and minor effects to the piping plover. This species would be displaced temporarily, which may affect foraging, nesting, and roosting activities. Long-term impacts are not anticipated.

4.14.2.3 Alternative 2

Potential impacts under Alternative 2 would be the same as those described under the Preferred Alternative.

4.15 CLIMATE CHANGE/ SEA LEVEL RISE

Climate change, specifically changes in temperature and precipitation, is understood to affect the water balance of river systems and connected estuarine systems (Parry et al. 2007). Climate change, as expressed in the Mississippi Gulf Coast, would be expected to alter freshwater flows from the Pascagoula River to Pascagoula Bay. These changes in freshwater flows would change estuarine salinity and circulation regimes, but the magnitude and details of these changes is unknown. The cumulative effects of these changes, in concert with implementation of the proposed project, are not known with enough detail to support further assessment. Specific studies to quantify and clarify these processes are currently underway, but results are unavailable at the time of writing (MDMR 2011a).

A literature search was conducted to identify and summarize available information for sea level rise and the Mississippi Gulf Coast. Relatively few sea level rise studies exist for the Mississippi Gulf Coast and very little information is available for Bayou Casotte at a local level.

In *Assessment of Sea Level Rise in Coastal Mississippi* (MDMR 2011a), the potential effects of sea level rise along the Gulf Coast are reported to be:

- Increased flood levels
- Higher storm surges
- Higher tide levels

A brief discussion of adaptation to climate change follows and is categorized into three primary response pathways, including armoring, retreating, and adapting. The State of Mississippi does not presently have a comprehensive strategy addressing potential impacts from sea level rise in coastal Mississippi (MDMR 2011); determining how/whether the proposed project might affect strategies to address sea level rise were not assessed.

4.15.1 No-Action Alternative

Trends in GHG emissions under the No-Action Alternative are anticipated to continue.

Even under the No-Action Alternative, the region will undergo changes as a result of sea level rise. Given the uncertain nature of sea level rise projections, the effects of sea level rise are not discussed as certain impacts, but as vulnerability. Under the No-Action Alternative, existing placement of dredged material to help maintain sediment budgets would continue. The region's vulnerability to sea level rise for the No-Action Alternative is summarized in this section.

No sea level rise vulnerability assessments were found for the Bayou Casotte region. Similarly, an adaptation assessment for Bayou Casotte and the surrounding region has not occurred. These facts limit the depth of analysis that is possible. Reports are available that examine the region's barrier islands vulnerability to the influence of sea level rise and climate change.

The barrier islands Horn Island and Petit Bois Island are dynamic landforms that change in response to storm frequency and intensity, relative sea level rise, and sediment supply (Morton 2003). Since the 1840s, the islands have lost land area. Between 1848 and 2005 Petit Bois Island lost 54 percent of its land area and Horn Island has experienced cumulative land loss of 11 percent since 1849 (Morton 2007).

The volume of sand supplied to these barrier islands by longshore currents has been reduced since the late 1800s as the outer bars at the entrance to Mobile Bay, Horn Island Pass, and Ship Island Pass were dredged to increasingly greater depths (Waller and Malbrough 1976, Byrnes et al. 1991, Morton 2007). Horn Island and Petit Bois Island are separated by Horn Island Pass and the Pascagoula Channel. The Horn Island Pass Channel has not been stabilized by hard structures such as jetties (Morton 2007). Sediment that would nourish the barrier islands along this coastline was trapped in dredged channels and removed from the littoral transport system by subsequent dredging and placement in disposal areas (Cipriani and Stone 2001, Morton 2007).

Continued rapid land loss from barrier islands is anticipated as a result of rising sea level, frequent intense storms, and reduced sediment supply.

4.15.2 Preferred Alternative

The GHG emissions of the Preferred Alternative would be so small as to be a negligible consideration. The main potential source of GHG emissions associated with the Preferred Alternative would be the loss of carbon sequestered in the ecosystem. The loss of SAV, especially seagrass, and loss of estuarine marsh wetlands would result in release of stored carbon to the atmosphere as carbon dioxide. Loss of carbon sequestration due to loss of seagrasses or other vegetation due to the Preferred Alternative is not anticipated due to the relative absence of SAV and emergent vegetation in the project footprint and sediment placement areas.

While no firm guidance exists on the quantity of greenhouse gas emissions that would be considered significant, the CEQ has issued draft guidance on assessment of GHG in NEPA (CEQ 2010). A reference point of 22,676 tons of direct CO_2-equivalent GHG emissions is suggested by CEQ as a potential indicator of insignificant effects. The potential GHG releases from the impacted ecosystem as a result of implementing the Preferred Alternative are anticipated to be far below 22,676 tons of direct CO_2-equivalent.

This section describes the Greenhouse Gas (GHG) emissions and their related impacts on climate change for the proposed project alternatives. The Preferred Alternative is used as the basis for this analysis as it results in higher estimated air emissions compared to the other alternatives. Air emissions from the Preferred Alternative will result from the operation of dredges, the support vessel, the multi-purpose construction vessel and the land-side construction equipment powered by internal combustion engines that produce exhaust emissions. Emissions from this equipment will result in an increase in GHG emissions that could contribute to global climate change. To date, specific thresholds to evaluate adverse impacts pertaining to GHG emissions have not been established by local decision-making agencies, the state, or the Federal government. The CEQ has published a “Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions,” February 10, 2010. The Draft Guidance suggests that the impacts of projects directly emitting GHGs in excess of 22,676 tons or more of carbon dioxide equivalent (CO_2e) emissions on an annual basis be considered in a qualitative and quantitative manner. However, the guidance stresses that, given the nature of GHGs and their persistence in the atmosphere, climate change impacts should be considered on a cumulative level. For consistency, this section presents a project-level analysis of GHG emissions.

An inventory of GHGs was prepared for project-related activities based on the schedule and other assumptions as discussed above. GHG emissions were estimated for emissions of carbon dioxide (CO_2), methane (CH_4), and nitrous oxides (N_2O) which are GHGs that may result from the combustion of fuel. The emission sources for each project alternative will consist of marine and land-based mobile sources that will be utilized as scheduled for the duration of the project. GHG emissions were estimated for each piece of equipment. The emissions were then categorized and totaled and broken out on an annual basis for each year for which dredging is projected to occur.

Load factors and emission factors for the different marine equipment were determined based on the EPA report "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data," February 2000 and information from the "California Climate Action Registry, General Reporting Protocol," January 2009. Mobile on-road emissions associated with employee vehicles were estimated from data provided in the Climate Action Registry (California Climate Action Registry 2009).

Additional dredged material would be available for helping to maintain sediment budgets in the project area. Climate change is expected to accelerate the geomorphic processes active in the Mississippi-Alabama barrier islands. Three of the most powerful drivers of barrier island processes in the Gulf coast region are the frequency and intensity of storms, change in sea level, and changes in sediment supply (Morton 2003). Climate change directly affects two of the three drivers (storm frequency and intensity, and sea level rise) while the Preferred Alternative does not affect these drivers. The Preferred Alternative does affect the third driver, sediment supply, and the cumulative impact of these processes warrants consideration.

For the Preferred Alternative, placement of suitable dredged material within the LZA is necessary to maintain the sediment budget of the coastal area. If the sediment budget is not maintained the vulnerability of Horn Island to the erosive effects of sea level rise would increase. If dredged material is permanently removed from the littoral sediment transport system of Horn Island the island's rate of land loss would accelerate thereby increasing the island's vulnerability to sea level rise and the vulnerability of the resources located on it. Impacts of the Preferred Alternative on sea level are negligible with respect to climate change effects. However, the relationship of the Preferred Alternative to climate changes is summarized in Table 4.15-1.

4.15.3 Alternative 2

GHG emissions under Alternative 2 are anticipated to be the same as those described under the No-Action Alternative.

The estimated annual GHG emissions as CO_2e for the Preferred Alternative are summarized in Table 4.15-2 for each year of the anticipated construction activities. Emissions from Alternative 2 would be less than those shown in Table 4.15-2.

Table 4.15-1
Sea Level Rise and the Proposed Project and No-Action Alternative*

Potential Sea Level Rise (SLR) Effects	Vulnerability with No-Action Alternative	Cumulative Impacts with Proposed Project
Storm surge	In concept, SLR will raise the elevation of tides and increase the height of surges.	The proposed project could increase the amplitude of storm surge in some locations, resulting in locally higher surge elevations, although this effect is likely negligible relative to the effects of SLR alone.
Extreme high tides	SLR will raise the elevation of tides, increase elevations of tidal-related flooding, and alter the frequency/duration of coastal inundation.	The proposed project may create greater tidal exchange and increase the amplitude of tides. However, the magnitude of additional exchange created by the proposed project is small in comparison to changes brought by sea level alone. As noted in Section 4.4, Hydrodynamics, any change in tides or tidal currents is expected to be insignificant.
Coastal wetland loss	SLR will drive coastal wetlands inland where topography and development do not hinder migration. Extreme sea level rise scenarios may exceed the maximum possible accretion rate of coastal wetland and lead to loss where inland migration is not possible.	The proposed project does not affect coastal wetlands directly but could conceivably alter the timing, frequency, and duration coastal wetland inundation by shifting tidal characteristics. However, this effect is expected to be insignificant.
Barrier island migration/erosion	SLR will drive geomorphic change of Horn Island and other barrier islands. Additional loss of the island's land area is expected.	The proposed project could increase the vulnerability of coastal barrier islands, specifically Horn Island by altering longshore sediment delivery across the channel.

*The effects of the Preferred Alternative and Alternative 2 are nearly identical with respect to climate change vulnerability. For this reason, the third column summarizes the effects together as the proposed project.

Table 4.15-2
Summary of GHG Emissions
(tons per year as CO_2e)

Activity	2014	2015
Dredging Activities	32,277	32,277
Centerline Range Relocation		47
On-Road – Work Truck and Employee Commuter Vehicles	8	8
Totals	32,285	32,332

Measures that may be used to reduce GHG emissions from the Preferred Alternative would consider the equipment used for the project over the expected life of the project and the feasibility and practicality of such measures. Alternatives considered for their ability to reduce or mitigate GHG emissions are those that may provide for enhanced energy efficiency, lower GHG-emitting technology, or the use of renewable energy, as appropriate, for the dredging and construction equipment to be used. Possible dredging mitigation options include the following:

- Design of the dredging operation and schedule so as to reduce overall fuel use
- Repowering/refitting with cleaner diesel engines
- Selection of newer dredges with more efficient engines, if possible.

As described above, the Preferred Alternative would increase GHG emissions. However, it would be unlikely that GHGs emitted would have an individually discernible impact on global climate change. GHG emissions accumulate in the atmosphere because of their relatively long lifespan. Consequently, their impact on climate change is independent of the point of emission. Because GHGs accumulate in the atmosphere and affect climate change on a global scale, it is not practical to predict the impact on climate change based on a project level evaluation; this analysis is more practically done on a regional or global scale.

Potential impacts on sea level rise resulting from Alternative 2 would be the same as those described for the Preferred Alternative with the exception that, under Alternative 2, less dredged material would be available to help maintain the sediment budget in the project area.

The interaction, or potential cumulative impacts, of sea level rise and the proposed project are given in Table 4.15-1.

4.16 CULTURAL RESOURCES

Any construction activity has the potential for adversely impacting cultural resource sites. Because this action requires Federal funding, permitting or assistance, Federal regulations established under Section 106 of the NHPA of 1966, as amended, provide standards for considering the severity of possible direct and indirect impacts. According to the Secretary of the Interior's regulations for protection of historical and archaeological resources (36 C.F.R. 800), adverse impacts may occur directly or indirectly when a project causes changes in archaeological, architectural or cultural qualities that contribute to a resource's historical or archaeological significance.

Direct impacts to cultural resource sites may occur during the construction phase of the proposed project and cause physical destruction or alteration of all or part of a resource. Typically, direct impacts are caused by the actual construction or as with this project, at the same time and location as dredging. Construction of the proposed project may directly alter, damage, or destroy historic shipwrecks, engineering structures or landscapes. Direct impacts may also include isolation of a historic resource from or alteration of its surrounding environment (setting).

Indirect impacts include those effects caused by the project that are further removed in distance, or that occur later in time but are reasonably foreseeable. These indirect impacts may include introduction of visual or audible elements that are out of character with the resource or its setting. Indirect impacts may also occur as a result of alterations in the pattern of land use, changes in population density, accelerated growth rates, or as with this project, increased shoreline erosion from increased nautical traffic. Historic shipwrecks, structures, landscapes, and archaeological sites along the shoreline are among the types of resources that might be adversely impacted by the indirect impact of the alternatives.

4.16.1 No-Action Alternative

Under the No-Action Alternative, no new or additional impacts are anticipated as no new activities would occur (maintenance dredging would continue). However, current conditions would continue to affect a post-Mexican War cemetery and further erode remaining portions of previously recorded sites 22JA516 and 22JA618 (USACE 2011a). Recent attempts to relocate site 22JA618 have failed and the site is likely completely eroded or has been covered with dredge spoil. Therefore, the No-Action Alternative will not have an effect on site 22JA618. Additionally, due to the negative results of the recent remote-sensing survey and subsurface probing undertaken by Earth Search, Inc., the No-Action Alternative also will not have an effect on the Mexican War-era graveyard associated with Camp Jefferson Davis (Grunewald 2012a). In the event that any burials are encountered, the burials will be handled in accordance with discovery procedures in the USACE-prepared Plan for the Treatment of Human Remains.

Phase II efforts undertaken by Brockington and Associates on behalf of the USACE Mobile District for the Preferred Alternative, in which 22JA516 was determined eligible for inclusion in the NRHP, as well as the proposed Phase III work that, according to the USACE Mobile District, will be completed during the construction phase of the project if the archaeological site cannot be avoided (RabbySmith 2012; Grunewald 2012b), while being mitigative, will adversely affect any remaining portions of site 22JA516.

The marine portion of the study area has had regular maintenance dredging and multiple marine surveys, including, but not limited to, Mistovich et al. (1983). According to the preliminary draft of the Feasibility Scoping Meeting Report, Bayou Casotte Harbor Channel Improvement Project (USACE 2011a), a "review of the previous studies and other data available identified no historic shipwrecks or anomalies suggestive of historic wrecks in Bayou Casotte." However, a study undertaken for the USACE Mobile District's proposed construction of authorized improvements to the Pascagoula Harbor Navigation Channel (USACE 2010) and the AWOIS database show the *Sea Bee* in the vicinity of the proposed project.

The fishing vessel *Sea Bee* was included in Local Notice to Mariners 42-80 (the 42nd report for the year 1980, 3rd week of October) stating that "the 38-foot fishing vessel *Sea Bee* previously reported sunk in approximate position 30 –18.2N, 88 –30.5W with 2 feet of the vessel showing above the water has been salvaged. Portions of the vessel have been reported in an area 300 feet northeast of the Bayou Casotte Light 8." NOAA Chart 11375, published on November 5, 1983, indicates an obstruction in the reported vicinity of the *Sea Bee* that was not present when the chart was published on July 12, 1980. This would indicate the obstruction on the chart was plotted after July 1980, which is in line with the October 1980 salvage of the *Sea Bee* as indicated in the referenced notice to mariners.

Background information indicates that the *Sea Bee* is a modern vessel, which sank in 1980 and has been partially salvaged. As such, the Sea Bee would not meet the minimum requirements for inclusion in the NRHP, and no further investigation would be warranted (Grunewald 2012a).

4.16.2 Preferred Alternative

The Preferred Alternative also has the potential to affect a post-Mexican War cemetery and further erode remaining portions of previously recorded sites 22JA516 and 22JA618 (USACE 2011a). However, recent attempts to relocate site 22JA618 have failed and the site is likely completely eroded or has been covered with dredge spoil. Therefore, the preferred action will not have an effect on site 22JA618. Additionally, due to the negative findings of the recent remote-sensing survey and subsurface probing undertaken by Earth Search, the Preferred Alternative also will not have an effect on the Mexican War-era graveyard associated with Camp Jefferson Davis (Grunewald 2012a). In the event that any burials are encountered, the burials will be handled in accordance with discovery procedures in the USACE-prepared Plan for the Treatment of Human Remains.

Phase II efforts undertaken by Brockington and Associates on behalf of the USACE Mobile District for the Preferred Alternative, in which 22JA516 was determined eligible for inclusion in the NRHP, as well as the proposed Phase III work that, according to the USACE Mobile District, will be completed during the construction phase of the project if the archaeological site cannot be avoided (RabbySmith 2012; Grunewald 2012b), while being mitigative, will adversely affect any remaining portions of site 22JA516.

The marine portion of the study area has been subjected to regular maintenance dredging and multiple marine surveys including, but not limited to, Mistovich et al. (1983). According to the preliminary draft of the Feasibility Scoping Meeting Report, Bayou Casotte Harbor Channel Improvement Project, a "review of the previous studies and other data available identified no historic shipwrecks or anomalies suggestive of historic wrecks in Bayou Casotte (USACE, 2011a)." However, a study undertaken for the USACE Mobile District's proposed construction of authorized improvements to the Pascagoula Harbor Navigation Channel (USACE 2010) and the AWOIS database show the *Sea Bee* in the vicinity of the proposed project.

The fishing vessel *Sea Bee* was included in Local Notice to Mariners 42-80 (the 42nd report for the year 1980, 3rd week of October) stating that "the 38-foot fishing vessel Sea Bee previously reported sunk in approximate position 30 –18.2N, 88 –30.5W with 2 feet of the vessel showing above the water has been salvaged. Portions of the vessel have been reported in an area 300 feet northeast of the Bayou Casotte Light 8." NOAA Chart 11375, published on November 5, 1983, indicates an obstruction in the reported vicinity of the *Sea Bee* that was not present when the chart was published on July 12, 1980. This would indicate that the obstruction on the chart was plotted after July 1980, which is in line with the October 1980 salvage of the *Sea Bee* as indicated in the referenced notice to mariners.

Background information indicates that the Sea Bee is a modern vessel which sank in 1980 and has been partially salvaged. As such the Sea Bee would not meet the minimum requirements for inclusion in the NRHP, as such no further investigation is warranted (Grunewald 2012a).

Dredged Material

In addition to widening the Bayou Casotte and the Pascagoula Lower Sound channels of the Pascagoula Harbor Channel, the Preferred Alternative and Alternative 2 would result in placement of dredged material within the EPA designated Pascagoula ODMDS and the designated LZA located east and south of the barrier islands. Because these areas were previously permitted and used for this purpose, previously recorded cultural resources within these areas have already been impacted, mitigated and/or no new or additional impacts to these resources are anticipated under the Preferred Alternative or Alternative 2. According to the 1990 Draft EIS for the Designation and Use of a New ODMDS, Pascagoula, Mississippi, "review and literature pertaining to the cultural resources of the general area of the proposed ODMDS's suggests that there are no natural or cultural features of historical importance within or in the vicinity of the proposed ODMDSs. Coordination, by letter dated January 25, 1989, with the Mississippi State Historic Preservation Office (SHPO) indicates that the potential for shipwrecks in open water of these depths is considered extremely low. In addition, since the use of the ODMDS is for disposal of dredged material, the possible conflict with unknown natural or cultural resources is reduced" (EPA 1990).

Mitigation

USACE prefers to avoid impacts to cultural resources where possible. Where avoidance is not possible, impacts can be mitigated in consultation with appropriate entities. An alternative form of mitigation of direct impacts can be developed for archaeological and historical sites with the implementation of a program of detailed data retrieval. Indirect impacts on historical properties and landscapes can be lessened through careful design and landscaping considerations. Additionally, relocation may be possible for some historic structures. It should be noted that mitigative efforts such as Phase II and Phase III investigations (detailed data retrieval) are often both destructive (impacting) as well as mitigative for archaeological and historical sites. Should any archaeological artifacts, including human remains, shipwrecks or other cultural resources be encountered during project construction, work should cease immediately in the vicinity of the resource, the discovery reported to the USACE and MDAH and action taken as directed.

In fall 2011, limited Phase II testing of site 22JA516 was conducted by Brockington and Associates on behalf of the USACE Mobile District for the Preferred Alternative. During the excavation, a substantial area of intact prehistoric midden was identified and the USACE Mobile District concluded the site to be eligible for inclusion in the NRHP under Criterion D for its potential to produce important information regarding local and regional prehistoric occupation, including information pertaining to prehistoric cultural chronology, subsistence patterns, intrasite use and mortuary practices (RabbySmith 2012).

Consequently, anticipated impacts to cultural resources eligible for listing in the NRHP within the area of potential effect (22JA516), if not able to be avoided, will require a Memorandum of Agreement (MOA), which will include the MDAH, USACE, Advisory Council for Historic Preservation (ACHP), and any interested federally recognized tribes, developed to mitigate any adverse effects. The USACE Mobile District has proposed a draft work plan for the archaeological Phase III data recovery of 22JA516. The proposed plan contains environmental and site-specific cultural overviews, an overview of completed cultural resources work at the site, a research design, Phase III archaeological methods, laboratory and specialized analysis methods, methods for curating materials, public interpretation/education, USACE-prepared Plan for the Treatment of Human Remains, and a project schedule. Within this plan, the Phase III archaeological methods will include a walkover survey/condition assessment, clearing of the work area, limited exploratory excavation, mechanized removal of the upper disturbed sediments, placement of excavation blocks, hand excavation, feature excavation, dewatering of the site, field documentation, collection of samples suited for special analysis, off-site water screening, and soil stripping. Following the investigation, specialized analysis and laboratory processing of collected materials will be undertaken. Unless otherwise specified, all material will be curated at the Charlotte Capers Archives and History. Throughout the project, various form of public outreach will also be conducted (Hendryx 2012). The USACE Mobile District has also initiated consultation with the MDAH and interested federally recognized tribes. An MOA between USACE and MDAH is under development and will document the final work plan, stipulations for avoidance and minimization of impacts, discovery clauses, etc.

4.16.3 Alternative 2

Potential impacts and mitigation under Alternative 2 would be the same as those described under the Preferred Alternative.

4.17 LAND USE

The Port of Pascagoula is an industrial port facility with specialized terminals for the import/export of petroleum, liquid natural gas, and phosphate product. Land uses adjacent to the Port include Chevron Pascagoula Refinery, MPC, First Chemical Corp., VT Halter Marine, Gulf LNG Energy, and

Signal International. Vessels accessing the Port transit from the Gulf of Mexico through the Pascagoula Bar, Horn Island Pass, Pascagoula Lower Sound and Bayou Casotte Channel. For the purpose of this analysis, these channel segments are considered as transportation land uses that carry commercial marine traffic from the Gulf of Mexico to the land side terminals in Bayou Casotte Harbor.

Land uses in the study area include the industrial, commercial, residential and public land uses of the City of Pascagoula. Potential impacts to land use in the study area would arise if the proposed project conflicted with current and planned land uses, or if the proposed project would convert a significant amount of land of one to use a different use that is incompatible with surrounding land uses.

Impacts to utilities could include direct impacts, such as the removal and disruption of utility lines such as transmission lines, distribution lines, pipelines, or cables. Other impacts may include increased demand for utility services as a result of construction or increased population that could result from the proposed project.

Impacts to transportation could occur if the proposed project caused delays in transit, or impacted the condition of surface transportation corridors, such as roads, highways, and rail. No increases in surface traffic are anticipated from the implementation of the Preferred Alternative or Alternative 2 due to the fact that no increases in vessels are anticipated. Therefore, no additional truck traffic for cargo transport is expected beyond what is operating at present. Current traffic patterns will remain unchanged and no roadway capacity improvements will be necessary.

No impacts to parks, recreational areas, or other community facilities would occur as a result of the implementation of the Preferred Alternative.

Potential impacts to public safety would be considered significant if the action caused delays in response times of law enforcement and emergency response, interfered with evacuation plans, or created a public health risk.

4.17.1 No-Action Alternative

No significant impacts to existing land uses, including utilities, transportation, parks and recreation, or public safety are anticipated as a consequence of the No-Action Alternative, as no new activities will occur. However, changes in land use, including utilities, transportation, parks and recreational facilities, or public safety may occur as a result of economic growth without the proposed project. Maintenance dredging would continue under this alternative and would not affect these resources.

Utilities

Under the No-Action Alternative, no changes to utility use or locations are anticipated.

Transportation

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

Parks, Recreation Areas, and other Community Facilities

Under the No-Action Alternative, there would be no changes to land uses in the study area. No impacts to parks, recreational areas, or other community facilities are anticipated.

Public Safety

Under the No-Action Alternative, existing public safety issues would not change, and there would be no changes to the Port that could potentially cause delays in response times or introduce public health risks.

4.17.2 Preferred Alternative

Utilities

Because the Preferred Alternative is limited to the Pascagoula Lower Sound and Bayou Casotte Channel, it is unlikely that dredging activities would result in an impact to local or regional utility services. There is a 12-inch-diameter pipeline that crosses Pascagoula Lower Sound Channel designated as a “spare” line that will be surveyed prior to construction and may be removed under this alternative; however, because this pipeline is not currently in use, no impacts are anticipated as a result of its removal.

Transportation

The channel widening is a navigation improvement designed to alleviate restrictions currently placed on commercial vessels accessing Bayou Casotte Harbor and improve the safety of vessels transiting the channel. This would result in a beneficial transportation impact for the Harbor. Impacts to surface transportation, such as roads, highways, and rail, are not anticipated to result because the proposed channel widening would not result in increased capacity. Therefore, operations would be unaffected.

Parks, Recreation Areas, and other Community Facilities

Because the Preferred Alternative would be limited to the Port, no impacts to parks, recreational areas, or other community facilities are anticipated as a result of the Preferred Alternative. Because the activities associated with the Preferred Alternative are consistent with current port activities, no potential indirect impacts to these areas are anticipated.

Public Safety

Widening the channel would alleviate existing vessel restrictions and maintain the safety of vessels transiting the channel. The Preferred Alternative decreases the probability of a catastrophic event occurring to any ship in the expanded channel.

In the event of such a catastrophe, emergency plans are in place that would enable the population to avoid contact with any contaminants. The USCG Captain of the Port (COTP) can establish an appropriate security zone for ships in transit in the channel. These security precautions assume a movable zone for ships carrying hazardous or volatile cargoes and a zone around moored ships (FERC 2006). The maritime enforcement and safety activities provided by the COTP may increase. The USCG will also place and maintain new channel markers to identify the boundaries of the new channel.

Since the primary cargoes entering the Port include petroleum and LNG, the COTP has the authority to institute safety requirements for both ships entering the Port and land use exclusionary zones around terminal facilities for the safety of all Port users. These exclusionary zone requirements are based on the locations and function of each individual terminal and are ascribed during the permitting and construction plan approvals.

The services provided by current law enforcement, medical response teams, and fire services are not expected to be impacted by the Preferred Alternative.

4.17.3 Alternative 2

Utilities

Similar to the Preferred Alternative, Alternative 2 is limited to the Bayou Casotte Channel. It is unlikely that dredging activities would impact local or regional utility services.

Transportation

Impacts associated with Alternative 2 would be similar to those of the Preferred Alternative.

Parks, Recreation Areas, and other Community Facilities

Because the Preferred Alternative would be limited to the Port, no impacts to parks, recreational areas, or other community facilities are anticipated.

Public Safety

Impacts associated with Alternative 2 would be similar to those of the Preferred Alternative. Because the population is not expected to increase significantly as a result of the proposed project (see Section 4.19.1), law enforcement, medical response teams, and fire services should be able to continue operating at their current capacities. Because no impacts to transportation are anticipated (see Section 4.18.4), there should be no effect to response times for law enforcement, medical and fire services.

4.18 SOCIOECONOMICS

With the exception of a small number of specialized construction workers, no impacts to the City of Pascagoula's population, employment and income, environmental justice, and protection of children are anticipated with the implementation of the Preferred Alternative or Alternative 2.

4.18.1 Population

Potential impacts to population are limited to a small number of specialized construction workers who will migrate to the area temporarily during construction activities.

4.18.1.1 No-Action Alternative

Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue). Current and projected population trends would continue, and there would be no impacts to the population of the study area.

4.18.1.2 Preferred Alternative

The Preferred Alternative would likely have a slight impact on population growth trends in Pascagoula and Jackson County, due to the migration of temporary specialized construction workers. During construction, potential in-migration of workers could lead to temporary increases in population and increased demand for temporary housing. These increases would be temporary, as workers would not permanently relocate. Any workers coming to Pascagoula for construction or employment would need housing. Currently, Pascagoula has an occupancy rate of 90.1 percent. Of these occupied homes, 56.7 percent of homes are owner occupied and 43.3 percent are renter-occupied. It is therefore likely that any in-migrating workers, whether relocating temporarily for construction or permanently, would be able to find housing (City-Data.com 2010). Law enforcement capabilities could possibly be required to expand if the population increases as a result of the Preferred Alternative. The Preferred Alternative would not require business or residential relocations.

4.18.1.3 Alternative 2

Alternative 2 would not require business or residential relocations. Impacts to population would be similar to those of the Preferred Alternative.

4.18.2 Employment and Income

4.18.2.1 No-Action Alternative

The No-Action Alternative would have no effect on local employment in the study area. It would not change the number of employed persons nor industry trends. Employment would increase in response to population trends. This alternative would not have significant impacts.

Because cargo volumes transported through the Port are expected to increase in the future, failing to widen the channels to alleviate transit restrictions could have a negative impact to the Port, as some vessel traffic could potentially be diverted (USACE 2011a). This could, in turn, lead to negative economic impacts in Pascagoula and Jackson Counties.

4.18.2.2 Preferred Alternative

The proposed project is a navigational improvement to the Pascagoula Lower Sound/Bayou Casotte Federal Channel segment of the Pascagoula Harbor. The channel improvement will reduce transit restrictions, improve port operations, and maintain safety conditions for ships entering the harbor. No direct increases in ship traffic are forecast due to the Preferred Alternative or Alternative 2. Full-time dredge workers would be needed throughout the duration of the construction period. Indirect and induced employment would occur in Pascagoula and Jackson Counties as dredge workers spend some of their disposable income locally and as operation of the dredges would necessitate expenditures on fuel that would be purchased from local vendors.

The benefits of a wider channel include greater operational efficiency (through reduction of delays) in the handling of both current and future traffic. These efficiencies will result in reduced operating costs for vessel operators and greater availability of marine terminals — an economic benefit for the vessel operators and/or marine terminal. Due to the high cost of operating these vessels, even a small reduction in delay can result in considerable savings for an operator. As an example, the day rate for a semisubmersible drill ranges from $250,000 to $400,000 per day. Because of the long transit times and narrow operating window, these vessels regularly wait a day or more for channel availability. With fewer transit restrictions of a wider channel, these delays will be reduced, thereby saving the operator time and money. Tanker rates may be up to $20,000 per day and LNG tanker rates range up to $100,000 per day. Although delays to tankers are typically shorter in duration, they are much more frequent and result in considerable costs.

4.18.2.3 Alternative 2

Potential impacts to employment and income resulting from Alternative 2 would be similar to those of the Preferred Alternative.

4.18.3 Environmental Justice

EO 12898 urges each Federal agency to achieve environmental justice by addressing "disproportionately high and adverse human health effects . . . on minority and low-income populations." While no minority populations were identified in the study area, one of the evaluated block groups (BG 1, CT 412) was identified as low income, with a median household income of $2,500. This block group covers areas outside of the study area, but the portion of the study area that it does cover is an unpopulated industrial area. Therefore, it is unlikely that any individuals within this block group would be disproportionately impacted as a result of any proposed activities.

4.18.3.1 No-Action Alternative

There are no environmental justice populations identified in the block group that includes the Port or the adjacent block groups. Therefore, no impacts are anticipated as a result of the No-Action Alternative.

4.18.3.2 Preferred Alternative

There are no environmental justice populations identified in the block group that includes the Port or the adjacent block groups. Therefore, no impacts are anticipated as a result of the Preferred Alternative.

4.18.3.3 Alternative 2

Potential impacts of Alternative 2 are the same as those described for the Preferred Alternative.

4.18.4 Protection of Children

There are no disproportionately large populations of children in the vicinity of the Port. However, there are children present in the vicinity of the proposed project (Block Group 509). Potential impacts to child populations are discussed below.

4.18.4.1 No-Action Alternative

Under the No-Action Alternative, there would be no change to Port operations and thus no additional risks to children. Under the No-Action Alternative, no additional impacts are anticipated, as no new activities would occur (maintenance dredging would continue).

4.18.4.2 Preferred Alternative

There are no schools or concentrations of children in the immediate vicinity of the project area. The project does not involve activities that would pose any disproportionate environmental health or safety risk to children.

4.18.4.3 Alternative 2

Potential impacts anticipated under Alternative 2 are the same as those described for the Preferred Alternative.

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5.0 CUMULATIVE IMPACTS

5.1 INTRODUCTION

Cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or persons undertake such action" (40 C.F.R. § 1508.7). The regulations further state that cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. Finally, ecological effects refer to effects on natural resources and on the components, structures and functioning of affected ecosystems, whether direct, indirect or cumulative.

This analysis considers the impacts of the proposed project in combination with past, present, and other reasonably foreseeable future projects in Bayou Casotte, the City of Moss Point (north of the Port of Pascagoula), and the Mississippi Sound. Potential cumulative impacts to the 16 environmental resources described in Section 4 were evaluated for 13 past, present, and reasonably foreseeable projects.

5.1.1 Cumulative Impact Assessment Methods

This section describes the application of the cumulative impact assessment methods to the proposed project. The geographic area for this assessment encompasses a 5-mile radius around the Port of Pascagoula, which is appropriate since potential impacts of the proposed project would be localized to the southern end of the Pascagoula River and coastal Mississippi watersheds and would have little effect on the upstream extents. Industrial and beneficial use projects are included in this analysis because of the similarity of their operations and associated impacts to the proposed project, and the resulting potential for cumulative impacts on the impacted resources.

Projects evaluated include the following:

Reasonably Foreseeable Future Actions

- Mississippi Integrated Gasification Combined Cycle, Moss Point
- VT Halter Marine
- Beneficial use sites, including Greenwood Island, Singing River, and Round River locations
- Port of Gulfport Expansion Project

Past or Present Actions

- Chevron Pascagoula Base Oil Facility
- Gulf Liquefied Natural Gas Clean Energy Project
- Mississippi Phosphates

- Signal International, LLC East Bank Yard
- Maintenance Dredging
- Beneficial Use Sites
- Pascagoula Bayou Casotte Terminals
- Pascagoula Harbor Navigation Channel
- Bayou Casotte Navigation Channel and Cyclical Maintenance Dredging

Impacts of these projects on the resources evaluated for the proposed project were summarized in Table 5.1-1, which appears at the end of this section to facilitate review. Several projects were not included in Table 5.1-1, but are described in sections 5.2 and 5.3, respectively. These projects are outlined below.

- The Port of Gulfport Expansion Project was not included because it is not currently reasonably foreseeable at this time, but is described in section 5.2.6.
- The current and proposed Beneficial Use Sites (i.e., Horn Island, Greenwood Island, Singing River, and Round River) were not included because their impacts are generally limited to only a few resource areas; however, they are described in sections 5.2.3–5.2.5 and 5.3.6 and their impacts are included in the total column of Table 5.1-1.
- Pascagoula Bayou Casotte Terminals were not included in the table because no additional environmental impacts are anticipated from the continued operation of these terminals; however, this project is discussed qualitatively in Section 5.3.7.
- The Bayou Casotte Navigation Channel and Cyclical Maintenance Dredging is not specifically included in Table 5.1-1 but it is included as part of the overall Maintenance Dredging category. Recent environmental regulatory compliance activities are described for MPC, but because no new environmental impacts are anticipated from continued operation this project was not included in Table 5.1-1.

Most of the reasonably foreseeable projects are planned, but do not have definitive implementation schedules due to a variety of factors including funding constraints. The cumulative impact assessment was conducted based on the general assumption these projects would move forward over the next 1 to 3 years. Best professional judgment was relied upon for cumulative impact assessment to a greater extent than the impact analyses for the proposed project (Section 4) because information on other projects was based entirely on the limited information available in the public domain.

This cumulative analysis covers activities since the landfall of Hurricane Katrina on August 29, 2005. This is consistent with the cumulative impact analysis for the Pascagoula Harbor Navigation Channel EIS, which found that the hurricane's substantial impact on coastal Mississippi and the Port of Pascagoula makes it a reasonable starting point for assessing project impacts (USACE 2010). This analysis predicts the impacts of reasonably foreseeable future actions to be completed within 3 years (2012 to 2015). The 3-year timeframe was chosen because this is the extent to which reasonably foreseeable future projects in this project area have been forecasted. With respect to regulatory actions undertaken since Hurricane Katrina, the USACE has issued 23 individual permits, 1 EIS, and 4 permit modifications that include authorizing 122.39 acres of wetland habitat to be filled, 5,527,343 cy of dredged material to be removed, 18 acres of dredge fill, 1.23 acres of dredged material removal, and construction of 17,427 feet of linear structures (see Table 5.1-2 at the end of this section). Approximately six Nation Wide Permits (NWP) are verified annually by the USACE; this trend is not anticipated to increase. The USACE is not aware of any additional major public or private sector projects, other than those listed above and discussed in sections 5.2 and 5.3, that would result or contribute in a significant manner to cumulative impacts associated with the proposed project.

5.1.2 Evaluation Criteria

Cumulative impacts were determined by reviewing the impacts described in the available documents as well as the resource discussion found in Section 4 of this EIS.

5.1.2.1 Individual Project Evaluation

Individual project documents such as public notices, draft and final EISs, newspaper articles, air pollution permits, hazardous waste reports and project fact sheets were reviewed for impacts to the resource areas. No attempts were made to verify or update those documents, and no field data were collected to verify the impacts described in the above documents. Also, for projects with final EIS documents that have since been constructed, proposed impacts and mitigation plans described in their respective EISs were not verified. Thus, this analysis recognizes that some of the projects are undergoing revisions that may alter their eventual environmental impact, but it has relied upon the best available information in existing published documents. Quantitative impact estimates have been included wherever possible, and summed across projects, but in many cases only qualitative information was available.

5.1.2.2 Resource Impact Evaluation

This analysis includes an evaluation of the biological/ecological, physical/chemical and cultural/socioeconomic impacts of the proposed project and other projects. Each of the evaluated projects is described below. Table 5.1-2 represents a summary of the impacts of the individual projects on each of the resources, as well as the total or cumulative impact anticipated to occur. Finally, the results section discusses the cumulative impacts on each of the resource areas, corresponding with Table 5.1-2.

Four General Permits (GP), 14 Standard Permits (SP), 9 Letters of Permission (LOP), 34 NWPs, 1 EIS, and 4 Permit Modifications (MOD) were completed within a 5-mile radius of the proposed project within the last 5 years (USACE 2012a). Ten of the 65 permits or modifications were for impacts affecting 1 or fewer acres of authorized fill projects. The largest permits were for the Chevron Refinery Expansion (66.99 acres) and Gulf LNG (7.43 acres) and the average was

4.25 acres. A table summarizing the 65 permits lists the permitee, USACE SAM number, type of permit, and number of acres permitted (Table 5.1-1).

5.2 REASONABLY FORESEEABLE FUTURE ACTIONS

5.2.1 Mississippi Integrated Gasification Combined Cycle, Moss Point

Mississippi Gasification (MG) has proposed to develop a substitute natural gas facility in Moss Point, Mississippi, approximately 7 miles up the East Pascagoula River from the Port of Pascagoula. The facility will utilize approximately 7,000 tons per day petroleum coke feedstock to produce 120 million standard cubic feet per day of pipeline-quality substitute natural gas. MG plans to capture 90 percent of the carbon dioxide (CO_2) produced and sell it to Denbury Onshore, LLC, under a long-term contract for enhanced oil recovery (EOR) sequestration. The project also includes construction of a 110-mile CO_2 pipeline to an existing Denbury pipeline to the north. Approximately 119 tons per day of slag (the non-hazardous, vitrified solid product of gasification) would be shipped offsite for sale or disposed of as non-hazardous waste. Up to 12 million gallons of water per day would be supplied from the Escatawpa River, supplemented by water from the Pascagoula River, well water and treated water near the site for industrial processing. The MG complex would utilize approximately 115 acres of floodplains and wetlands in the Moss Point Industrial Technology Complex which are currently undergoing remediation for past contamination from the paper mill previously located on the site and are designated for industrial use. Operation, maintenance and management of the facility are estimated to require 177 full-time positions (DOE 2009). The NOI to prepare an EIS was issued November 12, 2009, and a July 2012 Department of Energy (DOE) key EIS schedule indicates that the project schedule is still under development, with an estimated EIS completion date of December 2012 (DOE 2012).

5.2.2 VT Halter Marine

VT Halter Marine operates a shipyard in Bayou Casotte for constructing small to medium-sized oceangoing vessels up to 50,000 deadweight tons (VT Halter Marine 2012). VT Halter Marine's shipyard facilities include floating dry docks and mooring basins. The existing facility has an air quality permit that includes emissions of no more than 245 tpy VOC (MSDEQ 2010b) and in 2009 generated 46 tons of hazardous material (EPA 2009). In June 2011 VT Halter Marine filed an application with the Mississippi Department of Marine Resources (DMR) for a coastal wetlands permit and water quality certification to build an additional floating dry dock at their Bayou Casotte facility. The dry dock configuration would be an "L" shaped modular system comprised of two parts and would be approximately 715 feet by 389 feet. During loading operations, the dry dock would be rotated along the edge of the Federal channel limits and submerged by filling the ballast to sink the structure on the channel bottom. This would require dredging a 65 foot deep basin adjacent to the Federal channel. Construction of the floating dry dock would require the dredging of 811,865 cy and the excavation of 189,263 cy of uplands to a depth of 65 feet below mean low water. Suitable dredged material would be utilized for approved beneficial use (DMR 2011); however, at the time of this writing there is no beneficial use specifically determined for this project. Dredged material placement will require approval by both the MDMR and USACE.

5.2.3 Greenwood Island Beneficial Use Site

In 2010 the USACE constructed an 18-acre containment site using riprap barriers. The site is intended to establish a marsh habitat system as dredged material is placed within it. In 2011 the MDMR proposed that the site be expanded by an additional 632 acres for a total of 650 acres (USACE 2012). After the proposed expansion plans became public opposition mounted. At the present time, the project site is closed and the fate of this project is uncertain.

5.2.4 Singing River Beneficial Use Site

The Singing River could be expanded into a 425 acre artificially enlarged island created by the placement of dredged material behind a geotube dike system. The location is expected to receive additional dredged material as part of the long-term maintenance dredging of Pascagoula Harbor. Over a 20- to 30-year time span the site is expected to receive over 8 million additional cy of dredged material from maintenance dredging. Ultimately the site would be graded to allow for growth of emergent marsh vegetation.

5.2.5 Round Island Beneficial Use Site

The MDMR proposed the creation of an 800 acre beneficial use site surrounding Round Island; an island presently 45 acres in size (USACE 2011). The present island is mostly forested uplands with little marsh. The proposed expansion would take place over 10 years and utilize material from commercial, private, and public dredging projects. The first phase of the project would create approximately 200 new acres of upland and marsh habitat. Additional phases would be implemented as dredged material became available.

5.2.6 Port of Gulfport Expansion Project (for informational purposes)

The currently proposed Port of Gulfport Expansion Project involves filling of up to 400 acres of open-water bottom in the Mississippi Sound, the construction of wharfs, bulkheads, terminal facilities, container storage areas, intermodal container transfer facilities, dredging and dredged material disposal and infrastructure, and construction of a breakwater of approximately 4,000 linear feet. The proposed expanded port facility will be elevated 25 feet above sea level to provide protection against future tropical storm surge events (USACE 2011). The USACE issued a NOI to prepare an EIS on March 11, 2011. The Port of Gulfport is approximately 30 miles west of the Port of Pascagoula, so only positive socioeconomic impacts are expected (USACE 2010). While this is a planned project, the time of implementation is unknown, therefore it is not considered reasonably foreseeable. Consequently, the project was not addressed in Table 5.1-1, Cumulative Impacts Summary.

5.3 PAST OR PRESENT ACTIONS

5.3.1 Chevron Pascagoula Base Oil Project

Chevron is expanding its Pascagoula Refinery for the Pascagoula Base Oil Project (PBOP). The base oil facility would be capable of producing 25,000 barrels a day of base oil, which is used to produce premium lubricants such as motor oil. The project includes additional piping within an existing pipeway to transport feedstock and products, construction of a revetment for shoreline protection near Berth 7A and rerouting of the existing Transportation Workers Identification Credential (TWIC) fence to maintain port security. It also includes additional construction areas associated with the proposed piping, revetment, access roads, trestles, berths and related facilities within the marine area. Chevron will fill 2.99 acres in addition to the previously permitted 72.3 acres for a total of 75.29 acres of low-quality wetland; construct 47,490 square feet of overwater structures in place of the previously permitted 45,792 square feet; and fill up to 0.22 acre of unvegetated benthic habitat for construction of the revetment. Mitigation credits for wetland impacts will be obtained from the Rhodes Lake Mitigation Area as authorized by the USACE (USACE et al. 2011). Under the new plan, the refinery would have a net decrease of 86.53 tons per year of carbon monoxide. Nitrogen oxide emissions would reach 303.32 tons per year, also less than originally planned (Havens 2010). The refinery would emit 99.19 mcy VOC (MSDEQ 2010a). The facility is expected to generate 1,000 jobs over 2 years, with 20 permanent salaried positions. Construction of the PBOP began in October 2011 and is scheduled to be complete by year-end 2013 (Wilkinson 2011).

5.3.2 Gulf Liquefied Natural Gas Clean Energy Project

The project is an LNG import terminal located in the Port of Pascagoula with marine facilities for LNG ship unloading, LNG storage, and vaporization. The facilities have a maximum sendout capacity of 1.5 billion cubic feet per day of natural gas. The following is a list of facilities associated with the project:

- a ship berth and unloading facilities (i.e., marine facilities) capable of accommodating one LNG ship
- LNG transfer systems
- two 160,000-cubic-meter, full-containment, LNG storage tanks
- ten high-pressure submerged combustion vaporizers (SCV)
- vapor handling systems
- hazard detection and response equipment, ancillary utilities, buildings, and service facilities

- one 5-mile-long, 36-inch-diameter, natural gas sendout pipeline
- associated pipeline support facilities, including three interconnects/meter stations, one pig launcher, and one pig receiver.

Recent dredging for the Gulf LNG terminal basin used the Bayou Casotte Dredge Material Management Site (BCDMMS) for material placement and, based on a USACE estimate, the maintenance dredging quantity on a 3-year recurring cycle for the BCDMMS is approximately 580,200 cy (Anchor QEA 2012). Construction and operation of the Gulf LNG facility required about 82 acres of land and affected about 61 acres of bay bottom. According to information presented in the FEIS (FERC 2006), the Gulf LNG Project would have limited adverse environmental impact and the impacts would be most significant during the construction period. The fact that the LNG terminal made use of a site previously used for dredged material placement that has been designated for industrial development, as well as the use of FERC's Plan and Procedures to minimize impact on soils, wetlands, and water bodies have contributed to the reduced amount of long-term impacts associated with the Gulf LNG Project. No adverse impacts to federally or state-listed threatened or endangered species were expected, with the implementation of a Mitigation and Monitoring Plan for the Gulf sturgeon. Approximately 88 acres of wetlands and vegetation was temporarily impacted and 31 acres permanently impacted; however, a mitigation plan was prepared (FERC 2006). The LNG terminal became operational in October 2011 (Ward 2011).

5.3.3 Mississippi Phosphates (for informational purposes)

MPC facilities are located at the northern tip of the Bayou Casotte Channel to the east of the turning basin. MPC production facilities consist of two sulfuric acid facilities, a phosphoric acid facility, and a diammonium phosphate (DAP) granulation facility. DAP is produced by combining phosphate rock and sulfuric acid to form phosphoric acid, which is then mixed with ammonia to produce DAP, a dry granular material. The phosphate granulation facility has an annual production capacity of 850,000 tons, while the existing sulfuric acid facilities have sufficient capacity to produce 600,000 to 640,000 tons. If sufficient sulfuric acid is not produced by MPC facilities, supplies are augmented by purchased sulfuric acid. Production levels are increasing as production volumes increased by 7 percent in 2011 over 2010 levels. Domestic distribution of DAP is accommodated by rail, truck and barge. The facility emits 48.15 tpy VOC according to its air pollution permit (MSDEQ 2006). Lingering environmental issues are being actively addressed and no new facilities are planned. On March 4, 2011, MPC and the MSDEQ executed an Agreed Order which settled all matters asserted in a series of Notice of Violations with respect to alleged CWA violations, as well as any other National Pollutant Discharge Elimination System (NPDES) permit violations. Thus, no new environmental impacts are anticipated from continued operation of MPC facilities.

5.3.4 Signal International LLC, East Bank Yard

Signal International LLC operates their East Bank Yard in Bayou Casotte, specializing in marine drilling rig fabrication and upgrades, conversion and repair. The facility is 94 acres in total area and includes a 30,000 ton dry dock (Signal International 2012). The facility has an air quality permit that allows emissions of 249 tpy VOC (MSDEQ 2008) and in 2009 generated 12 tons of hazardous material (EPA 2009). In 2010, the company increased the dredging depth of a 3.5-acre area to 60 feet to accommodate deep draft vessels such as semi-submersible rigs (Wilkinson 2010). The dredged material was utilized for beneficial use at the former International Paper Mill site in Moss Point. Maintenance dredging is performed every 4 to 5 years with 10,000 to 20,000 cy of sediment dredged each time (USACE et al. 2008).

5.3.5 Maintenance Dredging

The Port of Pascagoula has been active since the early nineteenth century. By the 1830s, dredging of the eastern segment of the Pascagoula River accommodated larger oceangoing vessels. The Port of Pascagoula channel was widened to accommodate growing ship traffic in the late 1870s. Bayou Casotte was dredged and the harbor opened to shipping traffic in the late 1950s. The direct environmental impacts of historic dredging activities were rarely recorded. However, the cumulative impact of dredging on barrier islands has been studied in detail (Morton 2007).

In the 1850s the depth across the outer bar in Horn Island Pass was unmodified from its natural depth (14.8 to 16.7 feet). In the 1880s dredging of Horn Island Pass began and work started on the ship channel to Pascagoula (USACE 1935). By 1935 the dredged channel across the outer bar in Horn Island Pass had been deepened to 18.7 feet (USACE 1935). In 2005 the maintained dimensions of the outer bar channel were 43.3 feet deep and 443 feet wide and maintained dimensions of the Horn Island Pass Channel were 41.3 feet deep and 590.6 feet wide (Morton 2007).

The dredged entrance channel at Horn Island Pass is not stabilized by jetties and, with a dredged depth of over 23 feet below its natural depth, the channel acts as a trap for sediment moving west along Petit Bois Island (Morton 2007). A segment of the channel near the west end of Petit Bois Island was dredged to a depth of 55.1 feet to intentionally entrap sediment (Morton 2007).

The cumulative effect, from the nineteenth century to present, of deepening of the Horn Island Pass navigation channel through the outer bars is the impedance of sediment transport across the pass to the downdrift barrier islands. Historically, the trapped sediment was dredged and disposed of in areas where it was unavailable for barrier island nourishment. The timing and magnitude of channel dredging generally matches the historical trend of barrier island land loss (Morton 2007). Between 1848 and 2005 Petit Bois Island lost 54 percent of its land area and Horn Island has experienced cumulative land loss of 11 percent since 1849 (Morton 2007).

To maintain the intended dimensions of the Bayou Casotte Channel, dredging every 48 to 72 months is necessary (Johnson et al. 2010). The USACE Mobile District estimates that 3.98 mcy of dredged material from the Federal shipping channels will need to be removed and disposed of every 3 years for the next 40 years (Johnson et al. 2010).

5.3.6 Beneficial Use Sites (for informational purposes)

As noted above, routine dredging every 48 to 72 months is necessary to maintain the intended dimensions of the Bayou Casotte Harbor Channel (Johnson et al. 2010). Conventional disposal of dredged material typically has been accomplished by placement in sites along the margins of the channels or in unconfined open-water disposal sites offshore of Horn Island. However, as traditional disposal areas are becoming more constrained, consideration of potential new locations for the beneficial use of dredged sediment has increased in recent years. New or expanded beneficial use sites at Greenwood Island, Singing Island, and Round Island are under discussion.

An LZA disposal site is located just west of Horn Island Pass and south of Horn Island between the –14 and –22-foot depth (MLLW) contours. This site is designated to beneficially use material dredged from the channel near Horn Island Pass. Dredged material is pumped to an area west of the Federal channel where it is reintroduced into the east-to-west sediment transportation system. The LZA disposal site was positioned specifically to maximize sand migration to supplement the barrier island system. Suitable, sandy material dredged during new work or channel maintenance efforts are placed within the littoral disposal site as a beneficial use of dredged material.

In addition to placement of dredged material in the LZA, three additional types of beneficial uses are possible along the Mississippi Gulf Coast: marsh creation, small bird islands, and mosquito ditches (USACE 2010). Marsh creation is possible when dredged material is used to raise the intertidal elevation of the substrate. Small bird islands may be created where dredged material is placed in contained areas to form new habitat for migratory and resident bird populations. Dredged material could also be used to fill coastal “mosquito ditches” dug in the 1950s.

5.3.7 Port of Pascagoula Bayou Casotte Terminals (for informational purposes)

The Jackson County Port Authority operates four public terminals (E, F, G, and H) located just south of the MPC facility along the Bayou Casotte Harbor. These terminals accommodate a variety of conventional general cargo and dry-bulk materials in both foreign and domestic trade. The proposed project will have a positive interaction with the general operations of these terminals by providing more efficient use of the Bayou Casotte Harbor; however, no additional environmental impacts are anticipated as a result of continued operation of these four terminal facilities. Therefore, this present project was not included in Table 5.1-2.

5.3.8 Pascagoula Harbor Navigation Channel

In 2010, the USACE Mobile District completed a FSEIS examining the potential impacts associated with the construction of authorized improvements to the Pascagoula Navigation Channel (USACE 2010). The improvements considered included many alternatives for widening and deepening the channel as well as improvements to the turning basins and the impoundment basins. The FSEIS reviewed a previous EIS completed for Pascagoula Harbor in 1985 and provided updates on any new conditions since its publication.

The Proposed Action considered in the FSEIS includes widening and deepening of the Pascagoula Navigation Channel to its federally authorized dimensions as follows:

- Widen the Bar Channel to 550 feet
- Deepen the upper Pascagoula Channel segment to 42 feet
- Deepen the Horn Island Impoundment to 56 feet
- Advanced maintenance dredging of the entire Federal Pascagoula Harbor Navigation

Dredged material was placed in the existing Pascagoula ODMDS. Material with sand content above 70 percent was placed in the littoral zone site or the open-water area 10 location to maintain sediment supply to the barrier island system.

5.3.9 Bayou Casotte Navigation Channel and Cyclical Maintenance Dredging

The Bayou Casotte Navigation Channel is actively used for shipping and requires periodic dredging to maintain its intended dimensions. Dredging is performed by pipeline or mechanical dredge. Historically, material from the inner harbor was placed in the Greenwood Island and BCDMMS disposal areas (USACE 1992). Material from approximately mile 1.75 to mile 3 on the Pascagoula River has been placed either in Singing Island or the Ocean Dredged Material Disposal Site (ODMDS) (USACE 1992). Material from the Mississippi Sound has been placed in open water disposal areas and the ODMDS (USACE 1992). Dredging cycles occur irregularly every 18 to 36 months. Areas of the channel affected by shoaling are targeted for dredging and not all portions of the channel are dredged in each cycle.

5.4 RESULTS

The sections below describe potential cumulative impacts anticipated as a result of the proposed project combined with past, present and reasonably foreseeable future actions affecting the study area on the 16 resource areas described in Section 4 of this EIS.

5.4.1 Geology

The proposed project will dredge approximately 3.4 mcy of material to widen the Pascagoula Lower Sound Channel and Bayou Casotte Channel. Several other projects involve dredging (e.g., Gulf LNG, Signal International, Maintenance Dredging, Beneficial Use Sites, and Pascagoula Harbor Navigation Channel), leading to a cumulative net impact of 6.35 mcy of dredged material relocated to disposal areas, plus approximately 1.35 mcy additionally dredged each year in maintenance. The project actions would lead to permanent removal of bottom sediments; however, the total amount removed is not expected to interfere with the natural movement and deposition of sediments in the Mississippi Sound and because the underlying bedrock formations would not be altered, cumulative impacts from the listed projects to geological resources are considered to be negligible.

5.4.2 Coastal Processes

Coastal processes include tides, currents, and consequently, sediment transport. Potential cumulative impacts to coastal processes would be considered significant if there were a substantial alteration in these aspects of the Mississippi Sound as a consequence of implementing the listed projects. As described in Section 4.15.1, Horn and Petit Bois islands have lost area since the 1840s in response to storm frequency and intensity, relative sea level rise, and sediment supply. This pattern of sediment loss is expected to continue, and the cumulative impact of dredging associated with the proposed project and the other listed projects has the potential to increase the vulnerability of coastal barrier islands by maintaining these altered sediment delivery patterns. However, the cumulative impact of the proposed project in concert with the other listed projects is not a substantial alteration to the existing pattern of sediment loss. The past and present projects are already contributing to the altered sediment transport patterns, and of the reasonably foreseeable projects, only one involves dredging and the rest involve beneficial use. Additionally, the beneficial use of dredged material as a result of the proposed project will slightly reduce erosion occurring at Horn Island. Thus, the cumulative impact of the proposed projects and other listed projects is not anticipated to be significant.

5.4.3 Bathymetry

The proposed project would permanently alter the bathymetry of the 100-foot corridor to be widened along 7.2 miles of the existing channel; the depth increased from between 9 to 13 feet MLLW. However, the alteration would be minor and the project would have no permanent effects. Other projects discussed in sections 5.2 and 5.3 would also involve dredging (Gulf LNG, Signal International maintenance dredging, and Pascagoula Harbor Navigational Channel). The cumulative bathymetric impacts of all these actions is not expected to be significant because no permanent change in depth would occur that affects circulation patterns, currents, tides, and/or water movement within the Mississippi Sound.

5.4.4 Hydrodynamics

The proposed project is anticipated to have a minor impact on the hydrodynamics of the Mississippi Sound. Specifically, there will be a slight reduction in the time required for salinity levels to return to normal after heavy rains, but there will be little effect on salinity concentrations in dry periods. The other projects are either not likely to have an impact on the hydrodynamics or information on their potential impacts is not readily available (Port of Gulfport Expansion Project, Gulf LNG). Based on available information, the cumulative impact of these actions on hydrodynamics is not expected to be significant because of the primary influence of tides, winds and salinity from the Gulf of Mexico

5.4.5 Navigation and Port Facilities

Dredging (including maintenance dredging) associated with the proposed project and other listed projects may cause delays in shipping, but these delays would be temporary. Listed projects could also result in increased shipping traffic as vessels travel to and from the project facilities and add to the amount of cargo managed by port facilities. The cumulative impact of these actions may be a temporary delay in shipping during dredging operations and increased ship traffic and cargo managed by port facilities after listed projects have been implemented; potential impacts would be reduced due to an overall increase in port operational efficiencies.

5.4.6 Air Quality

Air emissions of major contaminants (i.e., VOC, NO_x, etc.) from dredging operations, construction vessel emissions and on-road vehicle emissions were estimated for the proposed project and compared to the 2002 emissions inventory for Jackson County. Due to the short-term duration of the channel widening activities, no long-term cumulative impacts to the area air quality are anticipated. Estimates of reasonably foreseeable future actions are not yet available; however, estimates of emissions from past and present actions are detailed in Table 5.1-1. The significance criteria for air quality cumulative impacts would be an exceedance of a chronic or acute state air quality standard caused by the proposed project in conjunction with other listed projects. The contribution of the proposed action in conjunction with other listed projects is determined not to have a significant cumulative impact on overall Jackson County air quality.

5.4.7 Noise

Dredging and associated noise generated by dredging vessels and dredge material placement for the proposed project and for the other projects described in sections 5.2 and 5.3 will be temporary in nature, thus impacts on marine wildlife such as displacement will be short-term. All of the mentioned projects are located within an industrial area and the additional noise that would be produced during construction would be consistent with the surrounding environment. Those projects resulting in new industrial facilities and/or operations would include noise attenuation features and would operate within local noise control standards. Underwater noise generated during dredging operations may cause marine species to temporarily avoid the general area, but species should return once dredging operations are terminated.

5.4.8 Hazardous, Toxic and Radioactive Waste

The HTRW investigation for the proposed project found several facilities with the potential for releasing hazardous substances into the environment, but the sites have either been remediated or no further remedial action is planned. Amounts of hazardous materials produced by several of the past and present actions are listed in Table 5.1-1; the potential for encountering HTRW through dredging operations is low, thus the cumulative impact of the actions described is not expected to be significant. In fact, in the case of Mississippi Integrated Gasification Combined Cycle (Moss Point) project, 115 acres of contaminated floodplain/wetland habitat would be remediated and converted to industrial uses. Hazardous materials/waste generated by new industrial processes and facilities would be managed under stringent permit conditions.

5.4.9 Water Quality

One of the cumulative impacts associated with the listed projects is short-term water quality degradation in the general vicinity of dredging operations and permanent changes to water quality in bottom habitats with increased depths. Dredging operations will result in temporary and localized water quality degradation, altering turbidity, conductivity, dissolved oxygen, and temperature regimes. More permanent changes are anticipated to occur where either a new channel or existing channel is widened to depths of 13.8 feet or greater. Channels deeper than 13.8 feet have been observed to have dissolved oxygen levels below the 4 mg/L State Standard and areas deeper than 19.2 feet are hypoxic (dissolved oxygen levels less than 2 mg/L), consistent with conditions in the existing Pascagoula Harbor Navigation Channel. Because water quality alterations from dredging operations are temporary and localized and the actual acreage of bottom habitat that might be permanently altered is small, in comparison to the overall size of the Mississippi Sound, cumulative impacts would be less than significant. No protected or commercially viable species, loss of unique or important habitat would result from these water quality alterations.

5.4.10 Sediments

Sediment related cumulative impacts involving the listed projects would occur during dredging and placement of dredged material. A significant cumulative impact would be a change in sediment characteristics that results in a permanent change in sediment quality, a decline in water quality as a result of sediment/water interactions, or temporary and permanent impacts to biological resources. Available sediment and water quality data obtained for the Pascagoula Harbor Navigation Channel SEIS did not find elevated concentrations of contaminants (USACE 2010). However, the SEIS did state low concentrations of contaminants could be suspended in the water column during dredging. The sediments to be dredged associated with the proposed project have a high silt and clay content (Anchor QEA 2012). Elevated levels of arsenic were found in some sediment samples, but did not exceed Probable Effects Level (PEL) guidance criteria. Bioaccumulation evaluations performed on two test organisms found elevated levels of arsenic, copper and lead. However, only lead was at a level requiring concurrence by the EPA prior to placement of dredged material; concurrence is needed to determine whether the sediments meet guidance for the Limiting Permissible Concentration for lead. Similar bioaccumulation studies were performed for pesticides and other contaminants and found for both dioxin congeners and one SVOC that EPA concurrence would also be required prior to placement of dredged material. Based on available information, impacts to sediment quality are expected to be temporary and not significant.

5.4.11 Freshwater Aquatic, Wetlands, and Terrestrial Plant Communities

The proposed project will have no impact upon freshwater vegetation communities in the study area (less than one percent of the study area is comprised of this habitat) but will have positive impacts on vegetation at the LZA site through the beneficial use of dredged material. Other projects (e.g., MS Integrated Gasification Combined Cycle Facility, Chevron PBOP, and the Gulf LNG Energy Project) will or have already temporarily or permanently impact(ed) approximately 200 acres of wetland habitat and approximately 80 acres of upland habitat (FERC 2006, DOE 2009, USACE et al. 2011). However, past and future actions are subject to regulatory authority by the USACE and wetland losses would be mitigated. Thus no significant cumulative impact is anticipated.

5.4.12 Marine Aquatic Communities

Cumulative impacts to marine aquatic communities would occur to open-water communities, benthic communities, oyster reefs, artificial reefs and invasive species in ballast water. The primary cumulative concern associated with open water habitats is increased turbidity which occurs as a result of sediment release during dredging. Increased turbidity can be detrimental to primary production associated with phytoplankton and algae by decreasing the light available for photosynthetic activity. Reductions in primary productivity would be localized and would be limited to the duration of plumes associated with dredging. Increased sedimentation would impact juvenile and adult finfish by disrupting foraging and feeding patterns; however these impacts would also be temporary and short-term. While elevated turbidities will impact the adult stages of filter-feeding organisms such as oysters and copepods by clogging filtering mechanisms, long-term cumulative impacts would be short-term and localized.

Cumulative impacts to benthic communities would generally be those associated with dredging and dredge material placement. Those projects involving a modification (e.g., widening) of an existing navigational channel could result in the permanent conversion of shallow, primarily silty clay soft bottom, to a deeper hypoxic habitat. For example, the proposed action would convert 87.6 acres of the shallow bottom habitat to a deeper and less productive habitat. During implementation of projects involving dredging operations the nature of impacts would consist of increased turbidity and a reduction of water clarity, temporarily impacting primary production and feeding activities of benthic organisms. Dredging activities will temporarily reduce biological diversity and the total biomass of benthic organisms within the impacted zones. However, recolonization of impacted areas occurs rapidly and no permanent consequences to the benthic community are anticipated to occur as a result of the listed projects. Within the dredged material placement areas, "new" habitat would be created. While species composition may change over time, biological productivity should remain unchanged.

Bottom habitat at the LZA and ODMDS sites would be buried during dredge material placement affecting benthic communities and oyster reefs; however, these sites are approved and active sites for maintenance dredging material placement. Buried organisms would be negatively impacted, but recolonization would occur rapidly, although shifts in species composition may occur. Artificial reefs are not located in the general vicinity of the proposed project and would not be impacted by maintenance dredging operations.

Increased vessel traffic within the Port of Pascagoula as a result of implementing the listed projects would increase the volume of ballast water and the associated potential for release of invasive species increased. However, the United States Coast Guard mandatory ballast water management protocols would be in place for all vessels; therefore minimal cumulative impact from ballast water and invasive species is anticipated.

5.4.13 Fish and Wildlife

The proposed and current projects will impact native wildlife species due to the loss of habitat; an amount difficult to ascertain because of the uncertainties associated with many of the listed projects. All of the described projects are located in an industrialized area with limited high quality or unique natural habitat in the vicinity of the listed projects Additionally the loss of wetland habitat is being mitigated for each project and should result in the establishment of alternative habitat suitable for displaced wildlife species. The noise and activity associated with each project will deter birds from using habitat in the areas and near the vicinity of construction and/or operations temporarily.

Similarly, dredging operations would temporarily reduce the quality of EFH in the vicinity of any of the proposed actions. Meanwhile some actions may permanently convert shallow, primarily silt and clay soft bottom habitats to deeper, hypoxic habitat reducing the functionality and ability of this natural system type to support federally managed species. For example, the proposed action would convert approximately 87.6 acres of shallow bottom habitat to deeper bottom habitat. While the overall cumulative conversion of habitat type may be judged as minor compared to the entire Mississippi Sound and the converted area does not included any seagrasses, the habitat conversion does represent a net loss of a more productive habitat (when compared with deeper, dredged channel bottom). Fish and shellfish species would temporarily shift feeding habitats during dredging operations to undisturbed areas until dredging and/or construction activities have been suspended and habitat recovery has occurred, thus the cumulative impacts would be temporary in nature. Dredged material placement for any of the listed actions is not anticipated to cause any long-term contamination problems for EFH.

None of the proposed or ongoing projects are anticipated to impact commercial or recreational fisheries in the study area. While many of the proposed and current projects involve dredging operations resulting in increased turbidity levels and degradation of water quality these impacts will be temporary and fish and prey populations will quickly return to pre-construction conditions.

5.4.14 Threatened and Endangered Species

Critical habitat for the Gulf sturgeon is located north of the barrier islands and within the study area. The Gulf sturgeon is known to migrate through the Mississippi Sound and migrations may occur at any time, although fall and winter are more likely times to encounter this fish. Because the sturgeon feeds on the bottom it is susceptible to capture and/or entrainment during dredging and dredge material placement activities associated with the listed projects. Thus, the cumulative impact associated with dredging activities for the projects listed above, including maintenance dredging, would be limited to incidental contact with foraging individuals. Widening of existing navigational channels, such as the proposed action, would convert shallow bottom habitat to less productive deeper habitat conditions in the immediate vicinity of these projects. The USACE and other action implementers are required to consult with the NMFS regarding potential impact(s) from dredging operations and placement of dredged material to Gulf sturgeon and Gulf sturgeon critical habitat.

Cumulative impacts to threatened and endangered species may also include the potential for vessel strikes with marine organisms. While sightings are rare, the West Indian manatee is known to migrate through the study area between Florida and Louisiana and could potentially be subject to collisions with shipping vessels. Additionally, several species of sea turtles are known to occur in the study area. The probability of a strike with adult turtles is rare because they prefer deeper waters and the study area does not provide a critical life history function. However, the late juvenile life history stages of sea turtles are benthic and potentially susceptible to capture or entrainment during dredging operations. Federal regulations are in-place to minimize the impact to juvenile sea turtles during use of hopper dredges. NOAA encourages dredging operations to occur during certain time periods to minimize potential impacts.

The Lower Pascagoula Navigation Channel extends between Horn Island and Petit Bois Island, both of which have been designated critical habitat for the wintering piping plover. Despite historic and continued high levels of shipping traffic, and ongoing maintenance dredging, the piping plover continues to winter on these two islands, which suggests the cumulative consequences of all the listed projects would have minor impact on this species. Direct impacts to designated critical habitat would not be anticipated as dredging operations for all projects would not encroach upon beach areas or either of the two Islands. Beneficial use of dredge material may cause temporary displacement of specific individuals but could result in the creation of additional suitable habitat for the piping plover.

5.4.15 Sea Level Rise/Climate Change

In concept, sea level rise will increase the elevation of tides and the height of storm surge activity; thus, any cumulative impact resulting from the alteration of navigation channels in Pascagoula Harbor or of shoreline features within Bayou Casotte Harbor would be minimal compared to the much larger influences resulting from changes in the Gulf of Mexico. While individual projects may create greater opportunities for tidal exchange and increase the amplitude for tides (associated with channel enhancement), these impacts are small in comparison to the predicted consequences of sea level rise alone. The listed projects could accelerate geomorphic change (i.e., land loss) for some barrier Islands with the alteration of sediment delivery across the navigation channel.

Limited information was available on this topic for the listed projects. What can be determined is that a temporary and insignificant amount of GHG emissions would be associated with those projects involving dredging and dredge material placement. Thus, the cumulative climate change impact attributed to the dredging components of the listed projects is not considered to be significant.

5.4.16 Cultural Resources

Numerous surveys have been conducted to identify potential cultural resources in the vicinity of Pascagoula Harbor and significant cultural resources have been identified. Thus, it is reasonable to assume that past dredging projects may have inadvertently impacted and resulted in the loss of some cultural resources. Based on a review of previously recorded cultural resources, the proposed project has the potential to adversely affect 22JA516 by further eroding remaining portions of the site.

Future maintenance dredging operations would occur in previously disturbed areas and thus pose limited potential for additional impacts to the previously described cultural resource if mitigation for this resource has been completed prior to future maintenance dredging. Construction of new facilities and pipelines associated with the listed projects may also impact the previously described cultural resource. Therefore, any activities should be coordinated with the appropriate regulatory agencies, including the USACE and MDAH, as appropriate, and action taken as directed. Dredged material placement on the Greenwood Island disposal site might also require additional mitigation if the disposal site adversely affects remaining portions of site 22JA516. Should any archaeological artifacts, including human remains, shipwrecks or other cultural resources, be encountered during project construction, work should cease immediately in the vicinity of the resource, the discovery reported to USACE and MDAH, and action taken as directed.

As described in previous sections, the USACE prefers to avoid impacts to cultural resources where possible. Where avoidance is not possible, impacts can be mitigated in consultation with appropriate entities. Consequently, anticipated impacts to cultural resources eligible for listing in the NRHP within the area of potential effect (22JA516), if not able to be avoided, will require an MOA, which will include the MDAH, USACE, and ACHP, and any interested federally recognized tribes, developed to mitigate any adverse effects. The USACE Mobile District has proposed a draft work plan for the archaeological Phase III data recovery of 22JA516. The proposed plan contains environmental and site-specific cultural overviews, an overview of completed cultural resources work at the site, a research design, Phase III archaeological methods, laboratory and specialized analysis methods, methods for curating materials, public interpretation/education, USACE-prepared Plan for the Treatment of Human Remains, and a project schedule. Within this plan, the Phase III archaeological methods will include a walkover survey/condition assessment, clearing of the work area, limited exploratory excavation, mechanized removal of the upper disturbed sediments, placement of excavation blocks, hand excavation, feature excavation, dewatering of the site, field documentation, collection of samples suited for special analysis, off-site water screening, and soil stripping. Following investigation, specialized analysis and laboratory processing of collected materials will be undertaken. Unless otherwise specified, all material will be curated at the Charlotte Capers Archives and History. Throughout the project, various form of public outreach will also be conducted (Hendryx 2012). The USACE Mobile District has also initiated consultation with the MDAH and interested federally recognized Native American tribes. An MOA is under development and will document the final work plan, stipulations for avoidance and minimization of impacts, discovery clauses, etc.

5.4.17 Land Use and Land Cover

While the proposed project will have negligible impact on land use, the cumulative impact of all listed projects on land use and land cover is an increased conversion of available open lands to industrial uses.

5.4.18 Socioeconomics

The listed projects are compatible with the economic goals of the Port of Pascagoula and would result in increased employment (more than 200 permanent jobs) and stimulation of the local economy. This is particularly important for an area still recovering from the aftermath of Hurricane Katrina and the Deepwater Horizon oil spill. Temporary employment opportunities would be created during construction of the MS Integrated Gasification Combined Cycle Facility, and Chevron PBOP. Temporary jobs would also be created by the projects requiring dredging. No environmental justice impacts are known to be associated with any of the channel improvement or maintenance dredging projects.

5.5 CONCLUSIONS

Cumulative impacts due to past, current, and reasonably foreseeable future projects (1–3 years), in combination with the proposed project, are not anticipated to have significant adverse impacts to the environmental resources within the project area. The majority of environmental impacts associated with the projects described in sections 5.2 and 5.3 will be temporary, and in most cases result in beneficial impacts to the region. One of the long-term cumulative impacts associated with the listed projects will be increased economic opportunity in terms of the number of jobs created and stimulus to the local economy.

Several of the projects included in the cumulative impact analysis involve dredging, some involving maintenance dredging, which result in temporary impacts such as increased turbidity, air emissions and long-term impacts to the harbor bottom. Widening of existing channels to depths of 19.2 feet or greater (i.e., to depth of existing channel, –42 feet MLLW) would convert shallow silty clay bottom habitat to less productive deeper habitat that most likely will be hypoxic with dissolved oxygen levels below 2 mg/L. Dredging associated with the evaluated projects may result in adverse water quality and sediment conditions because of low concentrations of some contaminants already in shipping channel sediments, but are not anticipated to be toxic to aquatic organisms.

The proposed project has the potential to adversely impact a previously recorded cultural resource that has been determined eligible for listing in the NRHP and will require mitigation as well as ongoing coordination with the USACE, MDAH, and any interested federally recognized tribes. Because current conditions would continue to adversely affect a previously recorded cultural resource, even dredging operations associated with listed projects that would primarily occur in previously disturbed areas may have cumulative impacts on cultural resources unless mitigation occurs prior to future dredging operations. Construction of new facilities and pipelines associated with the listed projects may also impact the resource, requiring coordination with the appropriate regulatory agencies, including the USACE and MDAH, as appropriate, and action taken as directed.

Existing governmental regulations will address the issues which influence local and ecosystem-level conditions. Natural resources in the area are provided protection through coordination with stakeholder groups, local organizations, and State and Federal regulatory agencies implementing regulations such as the CWA and the CAA (Section 11). This collaboration and regulation of impacted resources should prevent or minimize negative impacts which could threaten the health and sustainability of the region.

Table 5.1-1 Cumulative Impacts Summary

Resource	Reasonably Foreseeable Future Projects			Past and Present Actions					Total
	BCHIP Preferred Alternative	**Mississippi Integrated Gasification Combined Cycle (Moss Point)**	**VT Halter Marine**	**Chevron Pascagoula Base Oil Plant**	**Gulf Liquefied Natural Gas Clean Energy Project**	**Signal International, LLC East Bank Yard**	**Maintenance Dredging**	**Pascagoula Harbor Navigation Channel**	**Qualitative Summary of Cumulative Impacts**
Geology	Removal and relocation of 3.4 million cubic yards (mcy) of sediment to designated disposal areas.	NA	Dredging of 810 thousand cubic yards (cy) and excavation of 190 cy of uplands at Bayou Casotte to depth of 65 feet below mean sea level (USACE 2011f).	NA	Maintenance dredging of 115–180 thousand cy every 3 years with material going to Bayou Casotte Dredge Material Management Site (BCDMMS) (FERC 2006).	10–20 thousand cy of sediment dredged every 4–5 years as result of maintenance dredging (USACE et al. 2008).	Average 1.3 mcy dredged each year (Johnson et al. 2010)	7.9 mcy of dredged sediment removed including 4.9 mcy for new works and 3 mcy removed in maintenance dredging of existing channel (USACE 2010).	No cumulative impact to bedrock formations; 6.35 mcy of dredged sediment relocated to designated disposal areas, plus approximately 1.35 mcy dredged each year.
Coastal Processes	Negligible impacts to coastal processes such as tides and currents. Potential for long-term impact to barrier islands by altering longshore sediment delivery across the channel.	NI	Negligible consequences to tides and currents. Continuation of existing altered sediment transport patterns.	NI	Negligible consequences to tides and currents. Continuation of existing altered sediment transport patterns.	Negligible consequences to tides and currents. Continuation of existing altered sediment transport patterns.	Negligible consequences to tides and currents. Continuation of existing altered sediment transport patterns.	Negligible consequences to tides and currents. Continuation of existing altered sediment transport patterns.	Because of the relatively small portion of the Mississippi Sound to be impacted by listed projects, consequences to tides and currents would be negligible. Existing alterations to sediment transport patterns would be continued and slightly offset from beneficial use.
Bathymetry	Permanent change to channel depth of 9 to 13 feet to 42 feet mean low water level (MLLW). Temporary increase in elevations at BCDMMS.	No significant impact; project does not affect the existing channel or involve dredging.	Permanent change in immediate vicinity of new floating dry dock.	NI	Periodic, slight changes to the bottom depths after dredging and temporary elevation increase at disposal sites.	Periodic, slight changes to the bottom depths after dredging and temporary elevation increase at disposal sites.	Periodic, slight changes to the bottom depths of the existing channel after dredging and temporary elevation increase at disposal sites.	Permanent change in bathymetry at location of channel widening. Short-term changes in dredged material disposal areas (USACE 2010).	While several of the projects involve dredging, such as widening and deepening of existing navigational channels, the cumulative impacts would have negligible impact on water movement in the Mississippi Sound.
Hydrodynamics	Slight reduction in time required for salinity to return to normal after heavy rain; little effect on salinity concentrations during dry periods.	Unknown quantity of water would be required from the Pascagoula River for industrial processing (DOE 2009).	NA	NI	NA	Minor, if any, changes to existing salinity distribution patterns; small-scale, temporary changes in current patterns in littoral zone disposal areas.	Minor, if any, changes to existing salinity distribution patterns; small-scale, temporary changes in current patterns in littoral zone disposal areas.	Minor, if any, changes to existing salinity distribution patterns; small-scale, temporary changes in current patterns in littoral zone disposal areas (USACE 2010).	No significant cumulative impacts on hydrodynamics of the Mississippi Sound from the listed projects due to the primary influence of tides, winds and salinity from the Gulf of Mexico.

Table 5.1-1, cont'd

Resource	Reasonably Foreseeable Future Projects			Past and Present Actions					Total
	BCHIP Preferred Alternative	**Mississippi Integrated Gasification Combined Cycle (Moss Point)**	**VT Halter Marine**	**Chevron Pascagoula Base Oil Plant**	**Gulf Liquefied Natural Gas Clean Energy Project**	**Signal International, LLC East Bank Yard**	**Maintenance Dredging**	**Pascagoula Harbor Navigation Channel**	**Qualitative Summary of Cumulative Impacts**
Navigation and Port Facilities	Potential delays in shipping during dredging operations; ongoing sedimentation in the channel would require maintenance dredging.	Additional transport vessels may be required.	Additional transport vessels may be required.	NI	Temporary prohibition of other vessels while liquefied natural gas (LNG) in transit or docked due to security zone (FERC 2006).	NI	Potential shipping delays while dredging activities are occurring.	Allows access by larger shipping vessels and could increase number and frequency of ships entering both Pascagoula River Harbor and Bayou Casotte Harbor (USACE 2010).	Listed projects may well result in increased ship traffic and amount of cargo managed; potential temporary shipping delays during dredging operations. Potential impacts from increased ship traffic would be reduced by overall increases in port operational efficiencies.
Air Quality	Short term increase in air emissions from dredging operations, vessel emissions, and on road vehicle emissions; however, no long-term air quality impacts are anticipated. May require General Conformity Determination for NOx emissions if Jackson County is determined to be a nonattainment area during dredging operations.	NA	Operational air quality emissions regulated by state permit: not to exceed 245 tons per year (tpy) VOC (MSDEQ 2010b); 8.5 – 15.3 tpy NOx from dredging operations (USACE 2010).	Operational air quality emissions regulated by state permit: 303.32 tpy NO_x, 99.19 tpy VOC (MSDEQ 2010a).	NA	Operational air emissions regulated by state permit (estimated 250 tons per year VOC) (MSDEQ 2008); during maintenance dredging and disposal operations there would be a temporary and negligible increase in air pollutants.	Temporary and negligible increase in air pollutants during dredging and disposal operations (USACE 2010).	Temporary and negligible increase in air pollutants during dredging and disposal operations (USACE 2010).	Short term increase in air emissions from dredging operations, construction activities and from road vehicle emissions; however, no long-term air quality impacts are anticipated to occur. General Conformity for NOx emissions may be required for the Preferred Alternative if Jackson County is determined to be a nonattainment area during dredging operations.
Noise	Minor increase in surface noise levels during construction; however, all operations will be conducted within local noise control requirements. Marine species would temporarily avoid areas of anthropogenic noise sources during dredging operations.	This large industrial facility would increase ambient noise levels but would be designed with noise attenuation features to meet local noise control standards.	Increase in noise levels during construction; operational noise levels would be attenuated to meet local industrial control standards.	This large industrial facility would increase ambient noise levels; but would be designed to incorporate noise attenuation features designed to operate within local noise control requirements.	Underwater noise could cause a local and temporary avoidance behavior in fish but would not result in significant adverse impacts. No significant impacts to resources from above-ground noise.	Minor increase in noise during dredging operations; underwater noise levels may cause temporary displacement of marine species.	Minor increase in surface noise levels during dredging operations; underwater noise may cause marine species to temporarily relocate.	Surface noise expected to be below levels of other existing activities and below local control requirements. Underwater noise considered to be temporary and may cause displacement of marine species (USACE 2010).	The cumulative surface noise impact caused by dredging activities would be temporary and meet local noise requirements. Additional industrial facilities constructed and operated would add to the background ambient noise levels but would include appropriate attenuation features. Underwater noise would cause a local and temporary avoidance behavior in marine species.

Table 5.1-1, cont'd

Resource	Reasonably Foreseeable Future Projects			Past and Present Actions					Total
	BCHIP Preferred Alternative	**Mississippi Integrated Gasification Combined Cycle (Moss Point)**	**VT Halter Marine**	**Chevron Pascagoula Base Oil Plant**	**Gulf Liquefied Natural Gas Clean Energy Project**	**Signal International, LLC East Bank Yard**	**Maintenance Dredging**	**Pascagoula Harbor Navigation Channel**	**Qualitative Summary of Cumulative Impacts**
Hazardous, Toxic, and Radioactive Waste	No significant threat to the public or environment with respect to the transport, use or disposal of hazardous materials.	115 acres of contaminated floodplain would be remediated (DOE 2009).	Hazardous materials generated and managed under permit (EPA 2009).	Hazardous materials generated and managed under permit (EPA 2009).	No known hazardous waste sites or areas of known contamination on LNG terminal site or on centerline of proposed pipeline (FERC 2006).	Hazardous materials are generated and managed under permit (EPA 2009).	NI; sediments determined to be non-toxic.	While the EIS did not address HTRW topic; bottom sediments to be placed in designated disposal areas were found not to contain elevated levels of contaminants (USACE, 2010)	Dredging operations pose no significant threat to the public or the environment with respect to the transport or disposal of hazardous materials; port facilities do generated/manage hazardous materials that are managed under permit.
Water Quality	Permanent changes in dissolved oxygen (DO) (hypoxic levels) and water temperature are anticipated in dredged areas due to increased depths; represents negligible portion of the Mississippi Sound bottom habitat. Altered salinity gradients may impact anadromous fish species.	12 million gallons/day would be required for industrial processing and would be treated onsite to regulatory standards (DOE 2009).	Water quality impacts are anticipated to be short-term and minor. Permanent changes in DO (hypoxic levels) and water temperature are expected in dredged areas increased to depths below 19.8 feet.	Potential for temporary increases in turbidity and increases in total suspended solids due to wetlands being filled.	Limited, if any, water quality impacts resulting from disturbance of sediments during dredging. Temporary increase in total suspended solids (TSS) during dredging but no significant impact (FERC 2006).	Water quality impacts short-term and minor.	Water quality impacts anticipated to be short-term and minor.	Potential for temporary disruption of in-situ parameters (e.g., DO, turbidity, conductivity, and temperature) and permanent increase in bottom salinity resulting from dredging operations (USACE 2010).	Potential for temporary disruption of in-situ DO, turbidity, conductivity and temperature regimes during dredging operations; permanent changes in DO and water temperature in bottom habitat of channels dredged to a depth below 13.8 feet.
Sediment Quality	Concern regarding lead, dioxin congeners, and one SVOC contaminate levels; EPA concurrence needed to determine whether or not findings meet guidance for the Limiting Permissible Concentrations for these parameters prior to placement of dredged material.	NA	NA	NA	Sediments suitable for offshore placement.	NA	Low levels of contaminants could be suspended in water column during dredging operations.	No elevated levels of contaminants found in sediments; low levels of contaminants could be suspended in water column during dredging operations (USACE 2010.)	The cumulative impact of disturbance/removal of bottom sediments during dredging operations is the temporary elevation for some contaminants (e.g., dioxin congeners, lead, SVOCs) in the water column; however, not a significant impact as levels non-toxic to marine organisms. Impacts temporary and localized.

Table 5.1-1, cont'd

Resource	Reasonably Foreseeable Future Projects			Past and Present Actions					Total
	BCHIP Preferred Alternative	**Mississippi Integrated Gasification Combined Cycle (Moss Point)**	**VT Halter Marine**	**Chevron Pascagoula Base Oil Plant**	**Gulf Liquefied Natural Gas Clean Energy Project**	**Signal International, LLC East Bank Yard**	**Maintenance Dredging**	**Pascagoula Harbor Navigation Channel**	**Qualitative Summary of Cumulative Impacts**
Freshwater Aquatic, Wetland and Terrestrial Plant Communities	No anticipated impacts to freshwater or terrestrial plant communities; potential beneficial impacts due to dredged material placement at littoral zone area (LZA) site and littoral drift of sandy material and subsequent vegetative succession.	Utilize 115 acres of floodplains and wetland habitat that are currently contaminated and designated for industrial use. (DOE 2009).	NA	75.29 acres of low-quality wetland filled; mitigation credits will be obtained (USACE et al. 2011).	Construction would have temporary impacts on 20 ac of wetlands and 68.3 ac of upland vegetation; permanent loss of 4.9 ac emergent wetlands, 26.1 ac of vegetation and conversion of 2.6 ac from forested to emergent; have mitigation plan (FERC 2006).	No land vegetative cover would be impacted by this activity. Dredged material disposal may be used to create habitat at beneficial use sites.	No freshwater aquatic or terrestrial vegetative cover would be impacted by this activity. Dredged material disposal may be used to create habitat at beneficial use sites.	No vegetative impacts discussed in the Supplemental EIS (USACE 2010).	Dredging operations would have negligible cumulative impacts on freshwater aquatic, wetland, and terrestrial communities; once filled to capacity dredge disposal sites will have vegetative cover. Other listed projects will convert wetland and upland habitat to industrial usage and would be mitigated as appropriate.
Marine Aquatic Communities	Permanent conversion of 87.6 acres of shallow habitat to deeper habitat. Short-term turbidity increase during construction and placement operations may temporarily impact primary production and aquatic species. Temporary burial of benthic organisms in disposal sites may lead to species composition changes. Increased volume of ballast water discharge and potential associated invasive species.	Benthic habitat in 115 acre floodplain and wetland would be converted to industrial use (DOE 2009).	Conversion of shallow water bottom habitat to less productive deeper bottom habitat.	0.22 acre of unvegetated benthic habitat filled for revetment construction (USACE et al. 2011).	Permanent conversion of 61.3 acres of shallow, sandy soft bottom to deeper, silty-sand soft bottom, but no long term impacts to aquatic species (FERC 2006).	Short-term turbidity increase affecting primary production and aquatic species. Short-term displacement of species. Temporary burial of benthic organisms at disposal sites.	Short-term turbidity increase affecting primary production and disruption of some marine species; Short-term displacement of species. Temporary burial of benthic organisms at disposal sites.	Short-term minor displacement of benthic infauna and epifauna during dredging operations; temporary disruption of adult fish communities; potential short-term disruption of foraging behavior and activities of marine mammals (USACE 2010).	Dredging operations will convert shallow benthic habitat to less productive, deeper, hypoxic habitat; yet represents a very small portion of the bottom habitat of the Mississippi Sound. Temporary burial of benthic organisms during dredging operations may result in species compositional changes but impacted areas would quickly be recolonized. Temporary turbidity increases would impact primary production of algae and phytoplankton and alter finfish foraging and feeding patterns.
Fish and Wildlife	Short-term turbidity increase during construction; operations may temporarily impact fish, prey and diving birds. Potential temporary reduction in quality of essential fish habitat (EFH) and displacement of individual species. Temporary changes to fish and bird migration and distribution patterns.	NA	Initial determination found no substantial adverse impact on EFH or Federally managed fishery resources (USACE 2011).	Potential for temporary disturbance of fish and wildlife species.	No significant impact except on habitat; permanent loss of 4.9 acres intertidal wetland (EFH), but will be mitigated by converting upland to marsh (FERC 2006).	Short-term turbidity increase and short-term displacement of species (fish, prey species, and seabirds and shorebirds) during dredging.	Short-term turbidity increase and short-term displacement of species (fish, prey species, and seabirds and shorebirds) during dredging.	Temporary disruption of fish during dredging. Similar temporary disruption of bird nesting, marine mammal foraging. All impacts assumed to cease at end of dredging (USACE 2010).	Short-term disturbance of fish and wildlife behavioral patterns during dredging operations; temporary reduction in the quality of EFH habitat. Permanent habitat loss from other projects will be appropriately mitigated.

Table 5.1-1, cont'd

Resource	Reasonably Foreseeable Future Projects			Past and Present Actions					Total
	BCHIP Preferred Alternative	**Mississippi Integrated Gasification Combined Cycle (Moss Point)**	**VT Halter Marine**	**Chevron Pascagoula Base Oil Plant**	**Gulf Liquefied Natural Gas Clean Energy Project**	**Signal International, LLC East Bank Yard**	**Maintenance Dredging**	**Pascagoula Harbor Navigation Channel**	**Qualitative Summary of Cumulative Impacts**
Threatened and Endangered (T&E) Species	Temporary displacement of some T&E species may occur; potential incidental take of Gulf sturgeon within its critical habitat; temporary displacement of piping plovers during dredging and dredge material placement.	NA	Preliminary review indicates no impact on T&E species or their habitat (USACE 2011).	NA	No impact to Gulf sturgeon with implementation of Mitigation and Monitoring Plan and other measures; potential impact to least tern (FERC 2006).	NI	Potential displacement of some species and potential for incidental take of sea turtles and Gulf Sturgeon.	Temporary and minor impacts to sea turtles, Gulf sturgeon, and piping plover. All impacts are assumed to end with completion of dredging operations (USACE 2010).	Cumulative impacts from dredging operations will include temporary displacement of some T&E species; potential for incidental take of the Gulf sturgeon within its critical habitat and displacement of the piping plover during dredge material placement. Mitigation measures in place to avoid permanent impacts upon T&E species.
Sea Level Rise/ Climate Change	Could increase amplitude of storm surge in some locations; however, considered negligible when compared to other sea level rise impacts. Increased vulnerability of coastal barrier islands, specifically Horn Island by altering sediment delivery across the channel. Insignificant greenhouse gas (GHG) emissions; no other climate change related impact anticipated to occur.	90% of carbon dioxide (CO_2) recovered and sold for enhanced oil recovery sequestration (DOE 2009); therefore no significant impact expected.	NA (Information on this topic was not available).	NA (Information on this topic was not available).	NA; this topic was not presented.	NA (Information on this topic was not available).	Insignificant GHG emissions anticipated.	This topic not addressed in the final supplement EIS (USACE 2010).	In concept, sea level rise will increase elevation of tides and height of surges; thus the cumulative impact of the listed projects would be minor alterations of these much larger environmental consequences. Listed projects however could accelerate geomorphic change (i.e., land loss) for some barrier islands. No significant cumulative impact due to climate change associated with the listed projects; insignificant GHG emissions anticipated during dredging operations.

Table 5.1-1, cont'd

Resource	Reasonably Foreseeable Future Projects			Past and Present Actions					Total
	BCHIP Preferred Alternative	**Mississippi Integrated Gasification Combined Cycle (Moss Point)**	**VT Halter Marine**	**Chevron Pascagoula Base Oil Plant**	**Gulf Liquefied Natural Gas Clean Energy Project**	**Signal International, LLC East Bank Yard**	**Maintenance Dredging**	**Pascagoula Harbor Navigation Channel**	**Qualitative Summary of Cumulative Impacts**
Cultural Resources	Potential to adversely affect a cultural resource (22JA516) eligible for listing on the NRHP within the area of potential effect. If not avoided, appropriate mitigation measures should be coordinated with the MDAH, USACE, and any interested federally recognized tribes.	NA	Located in a submerged area; therefore, not anticipated to affect sites in, or eligible for, the National Register of Historic Places (NRHP) (USACE 2011).	NA	No impact on any properties listed, or eligible for listing, in the NRHP (FERC 2006).	Potential to adversely affect cultural resources eligible for listing in the NRHP within the area of potential effect as well as the *Sea Bee*. If not avoided, appropriate mitigation measures should be coordinated with the MDAH and USACE.	Potential to adversely affect cultural resources eligible for listing in the NRHP within the area of potential effect. If not avoided, appropriate mitigation measures should be coordinated with the MDAH and USACE.	No impacts anticipated to occur to known cultural resources; any unanticipated impacts would be mitigated by avoidance and/or coordination with the SHPO (USACE 2010).	Potential to adversely impact a cultural resource site (22JA516) eligible for listing in the NRHP. If not avoided, appropriate mitigation measures should be coordinated with the MDAH, USACE, and any federally recognized tribes. Future maintenance dredging operations pose limited potential for additional impacts to the cultural resource if mitigation for the resource has been completed prior to future maintenance dredging. Construction of new facilities and associated pipelines may also impact the cultural resource; any activities should be coordinated with the appropriate agencies.
Land Use	Land use impacts compatible with surrounding industrial complex; no increase in surface traffic or impacts to parks, recreational areas, or community facilities.	115 acres of contaminated floodplain and wetlands would be converted to industrial use (DOE 2009).	Conversion of open land to industrial usage.	Conversion of 3 acres of low-grade wetland habitat to industrial use (USACE et al. 2011).	82.4 acres of land would be converted to industrial usage with 24.9 acres of new permanent right-of-way and 1.2 acres of above-ground facilities (FERC 2006).	Use and alteration of designated dredge material disposal areas.	Use and alteration of designated dredge material disposal areas.	Long-term increase in ship, vehicular and rail traffic; a gas utility line would be impacted during dredging operations (USACE 2010).	Dredging operations result in negligible land use impacts; Pascagoula Harbor projects will result in increased ship, rail and vehicular traffic. Other listed projects will involve conversion of open land to industrial usage that is compatible with surrounding industrial complex.
Socioeconomics	Initial dredging will create temporary job opportunities; no environmental justice related impacts to occur; no disproportional environmental health or safety risk to children.	Estimated to create 177 full-time positions (DOE 2009).	Additional floating dry dock capacity may result in additional job creation. No environmental justice related impacts anticipated.	Generate 1,000 construction jobs with 20 permanent positions (Wilkinson 2011).	Temporary increase in workforce by creation of 259 jobs, with 50 permanent jobs created (FERC 2006).	NI	Create temporary jobs every three years; no environmental justice related impacts.	Long-term economic benefit from increased shipping. No impacts on environmental justice. Expected to aid regional economic recovery from Hurricane Katrina (USACE 2010).	Port expansion projects and channel improvements are expected to increase the amount of cargo managed through Port of Pascagoula facilities resulting in new jobs created. No environmental justice impacts are known to be associated with any of the channel improvement or maintenance dredging projects.

NI = no long-term impact(s) anticipated from the specific action for the listed impact category based on available information of the past, current, or reasonably foreseeable future action and knowledge of affected environment; anticipated impacts are of short duration from which the environmental resource will fully recover.

NA = not available.

Table 5.1-2
U.S. Department of Army (DA) Permits for Projects within a
5-Mile Radius of the Port and Issued within the Past 5 Years (January 2012)

DA Number	Project Name	Distance from Port	Permit Type	Authorized Fill (Acres)
SAM-2004-02484-DJS	Gulf LNG	0.92	EIS	7.43
SAM-2010-00501-SPG	G-Dock Repair	0.73	LOP	0
SAM-2007-00996-JBM	Jackson County Board of Supervisors (Bayou Chico)	0.76	LOP	0
SAM-2011-00740-TMZ	SHANNON STRUNK	0.83	LOP	0
SAM-2009-01771-SPG	VT Halter Marine	0.88	LOP	0
SAM-2010-00680-SPG	Midstream Fuel Service, LLC (Deepwater Horizon Oil Spill Emergency Permit)	1.3	LOP	0
SAM-2008-00971-JBM	Jackson County Port Authority – Cathodic Protection System	3.58	LOP	0
SAM-2006-01983-MFM	NORTHROP-GRUMMAN SHIP SYSTEMS INGALLS	3.92	LOP	0
SAM-2011-01327-TMZ	Signet Maritime Corp.	4.04	LOP	0
SAM-2010-00870-DMY	Jackson County Vertical Sorbent Fabric – Emergency – Deepwater Horizon Oil Spill	4.88	LOP	0
SAM-2004-02484-DJS	Gulf LNG	0.92	MOD	1.55
SAM-2008-00603-JBM	Chevron Refinery Expansion	2.49	MOD	2.3
SAM-2008-00603-JBM	Chevron Refinery Expansion	2.49	MOD	2.99
SAM-2004-02628-L	NORTHROP GRUMMAN SHIP SYSTEM	4.28	MOD	0
SAM-2011-00183-PAH	Chevron High Viscosity Crude Project	0.57	NWP	0
SAM-2008-01420-JBM	Chevron Firewater Road	0.67	NWP	0.05
SAM-2008-01115-JBM	Jackson County Board of Supervisors	0.68	NWP	0
SAM-2006-02606	Chevron (Bayou Casotte wharf pilings)	0.73	NWP	0
SAM-2010-01676-KMN	First Chemical – Maintenance of Existing Bulkhead; Pascagoula MS; Bayou Casotte	1	NWP	0
SAM-2011-00182-PAH	Chevron Pipeline Company	1.31	NWP	0
SAM-2010-00704-DMY	Todd Williams Lay Down Area – Deepwater Horizon Oil Spill Emergency	1.52	NWP	0.26
SAM-2011-01038-TMZ	City of Pascagoula – Bayou Casotte WTF Flood Wall	2	NWP	0.065
SAM-2009-01199-JBM	Beach Blvd. Bridge Replacement	2.01	NWP	0
SAM-2011-00625-MJF	Jefferson Ave. & 2nd St. Alignment A, B, & C; Bayou Casotte	2.34	NWP	
SAM-2007-00063	USCG (Range A & Horn Island Pass)	2.47	NWP	0
SAM-2011-00284	Pascagoula Channel A Range Front Light Removal	2.47	NWP	0
SAM-2007-00729	NRCS (Ingalls Avenue)	2.49	NWP	Unknown

Table 5.1-2, cont'd

DA Number	Project Name	Distance from Port	Permit Type	Authorized Fill (Acres)
SAM-2008-00607-JBM	Chevron Pascagoula Refinery	2.54	NWP	0
SAM-2007-01392-JBM	Tri-States NGL Pipeline (Pascagoula)	2.57	NWP	0.07
SAM-2010-00190	MDOT LPA Old Mobile Highway Bridge Replacement Jackson County	2.63	NWP	0.01
SAM-2008-00411-JBM	Chevron Parking Lot (Industrial Road)	3	NWP	0.24
SAM-2006-02480	Northrop Grumman project	3.05	NWP	
SAM-2007-01724	Community Street Lift Station	3.07	NWP	0.007
SAM-2010-01106-DMY	Chevron – North Access Road	3.31	NWP	0.24
SAM-2010-01106-DMY	Chevron – North Access Road	3.31	NWP	0.05
SAM-2006-01011	Gulf LNG	3.35	NWP	0
SAM-2011-00708-AFM	JCBoS – Telephone Rd./Cataipa Ave. Dredge Maint.	3.53	NWP	0
SAM-2010-01064-SPG	BP US Pipelines	3.57	NWP	0.25
SAM-2009-00273-JBM	A. Baker Marina (Lake Ave.)	3.75	NWP	0
SAM-2009-01158-MMG	Pascagoula Riverfront Redevelopment	3.75	NWP	0
SAM-2009-00945-CRO	Transco/Florida Gas Pascagoula Expansion	3.84	NWP	7.09
SAM-2007-01091-JBM	Ferrer, Joe (5202 River Rd)	3.88	NWP	0
SAM-2008-01005	Signal International, LLC, unauthorized placement of fill into Section 10 waters, Pascagoula River	3.95	NWP	0
SAM-2008-01276-KMN	USGS, Mississippi Science Center	4.51	NWP	0
SAM-2011-01381-KMN	JCBoS – Gregory Street Drainage	4.79	NWP	0
SAM-2007-02114-MFM	Collect Sediment Cores Grand Bay NERR	4.82	NWP	0
SAM-2011-00393-SPG	USM Gulf Research Lab	4.83	NWP	1
SAM-2007-01311-DMR	James Walley	0.93	PGP	0
SAM-2006-00754	U.S. Coast Guard (Enger & St Mary Canal)	0.83	RGP	0
SAM-2007-00793-MFM	USCG (Yazzo Lake)	2.65	RGP	0
SAM-2007-00558	USCG (Pascagoula River)	3.46	RGP	0
SAM-2010-01713-KMN	Greenwood Island Riprap	0.21	SP	0
SAM-2010-01713-KMN	Greenwood Island Riprap	0.21	SP	0
SAM-2008-00414-JBM	Signal International Dry Dock (Bayou Casotte Parkway)	0.25	SP	0
SAM-2010-00501-SPG	G-Dock Repair	0.73	SP	0.14
SAM-2010-01074	Maintenance Dredging Gulf LNG	0.85	SP	0
SAM-2007-00814-TMZ	Port of Pascagoula (Bayou Casotte Terminal)	1.03	SP	4.9
SAM-2007-01925-JBM	Mississippi Phosphates Corp. (601 Hwy 611)	1.11	SP	0

Table 5.1-2, cont'd

DA Number	Project Name	Distance from Port	Permit Type	Authorized Fill (Acres)
SAM-2009-01756-TMZ	Brandon Bosarge	1.62	SP	0
SAM-2009-01756-TMZ	Brandon Bosarge	1.62	SP	0
SAM-2007-01498-JBM	Chevron Products (Effluent Treatment System)	2.1	SP	32.6
SAM-2007-01587-JBM	Chevron Products Company (access road)	2.4	SP	3.19
SAM-2008-00603-JBM	Chevron Refinery Expansion	2.49	SP	66.99
SAM-2010-00186-KMN	Port of Pascagoula-JCPA-Maint. Dredge/Terminal Expansion	3.5	SP	0.3
SAM-2008-00325-JBM	NOAA Pascagoula Dock Dredging	3.81	SP	0

6.0 MITIGATION

This section presents proposed and potential mitigation measures with respect to potential impacts from the Preferred Alternative and Alternative 2. A more-thorough discussion of impacts is presented in Section 4, Environmental Consequences, and pertinent regulations are addressed in Section 11, Permits. A copy of the permit application for the project is provided in Appendix G of this EIS.

The Council on Environmental Quality (CEQ) defines mitigation to include avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 C.F.R. 1508.20). Under the Section 404 permit, USACE is responsible for determining compliance with the CWA and NEPA, as well as whether mitigation is required for environmental impacts that may result from project implementation. The process by which USACE reviews permit applications under Section 404 is described in 33 C.F.R. § 325. Appendix B of 33 C.F.R. § 325 prescribes the NEPA implementation procedures for the regulatory program and authorizes USACE to place special conditions on the permit to ensure that mitigation is implemented.

Unavoidable Impacts

Potential impacts associated with the proposed project were avoided and minimized through project planning and coordination with State and Federal agencies. Minimization of impacts included elimination of alternatives with greater than 100 feet of channel widening, as detailed in Section 2.3, Preliminary Array of Alternatives of this EIS. Potential impacts are also anticipated to be primarily temporary and minor in nature and limited to periods of construction. The 100 feet of widening was determined necessary to meet the primary objectives of this project: alleviate existing navigation restrictions in several portions of the channel, and increase opportunities for night transit and two-way traffic for many vessels presently using the Port. The No-Action Alternative would avoid new dredging impacts but would not meet the project objectives, while the Preferred Alternative (Alternative 1) and Alternative 2 would result in 87.6 acres of new dredging.

Unavoidable impacts to bay bottom as a result of dredging and placement of dredged materials are anticipated. Therefore, the remainder of this mitigation discussion focuses on physical elements of channel-widening, and disposal of dredged material. Potential long-term effects of the dredging include increased vulnerability of coastal barrier islands by altering longshore sediment delivery across the channel, and alterations in temperature and dissolved oxygen (DO) due to permanent conversion of shallow areas to the greater depths necessary for navigation. Mitigation for impacts to coastal barrier islands under the Preferred Alternative (Alternative 1) would include 125,000 cy of material suitable for beneficial use at the designated LZA. Alternative 2 would generate 315,000 cy of material suitable for beneficial use. The No-Action Alternative, while maintaining existing patterns of sediment loss from barrier islands, dredged material for beneficial use would continue to be available only as a result of maintenance dredging.

Each action alternative would require the permanent conversion of 87.6 acres of shallow-water habitats to deeper habitat. This will result in an adverse impact to EFH, and living marine resources that the shallow-water habitat supports, including prey items of recreational and commercial fisheries, and the threatened Gulf sturgeon. This amount would be considered minimal given the overall amount of habitat present, combined with disturbed nature of the channel corridor due to present uses, and the absence of vegetation and oysters. Therefore, significant impacts to the bay bottom habitat as a result of the project are not anticipated.

Potential short-term effects of the proposed project include, increased turbidity, potential contaminants in dredged sediments, impacts to Gulf sturgeon and sea turtles, increased greenhouse gas (GHG) emissions.

The proposed project has the potential to adversely affect remaining in situ burials associated with the post-Mexican War period and further erode remaining portions of sites 22JA516 and 22JA618 (USACE n.d.), as described in Section 4, Environmental Consequences. Impacts to a shipwrecked vessel in the vicinity of the project are also possible.

Proposed Mitigation Measures

Mitigation measures for the impacts described above include avoidance, minimization, rectification, reduction, and compensatory measures (outlined below).

- Efficient scheduling to minimize the duration of disturbance.
- The Applicant will implement appropriate turbidity control measures for the project to minimize turbidity and maintain low turbidity levels within the immediate dredging area.
- If warranted, the Applicant will supplement the analysis of dredged sediments for the presence of contaminants prior to placement. If present, contaminated sediments will be mitigated via measures determined through coordination with EPA.
- The Applicant will comply with Best Management Practices and work schedules in accordance with the NMFS BO for Gulf sturgeon and sea turtles to minimize impacts to those species.
- The Applicant may minimize GHG emissions during dredging operations by schedule/ operation planning to minimize fuel use, utilizing cleaner diesel engines, and/or selecting newer dredges with more-efficient engines.
- Anticipated impacts to 22JA516 will require mitigation actions developed through an MOA between the MDAH, USACE, ACHP, and any interested federally recognized tribes (further details provided below).

As described in previous sections, the USACE prefers to avoid impacts to cultural resources where possible. Where avoidance is not possible, impacts can be mitigated in consultation with appropriate entities. Consequently, anticipated impacts to cultural resources eligible for listing in the NRHP within the area of potential effect (22JA516), if not able to be avoided, will require an MOA, which will include the

MDAH, USACE, ACHP, and any interested federally recognized tribes, developed to mitigate any adverse effects. The USACE Mobile District has proposed a draft work plan for the archaeological Phase III data recovery of 22JA516. The proposed plan contains environmental and site-specific cultural overviews, an overview of completed cultural resources work at the site, a research design, Phase III archaeological methods, laboratory and specialized analysis methods, methods for curating materials, public interpretation/education, USACE-prepared Plan for the Treatment of Human Remains, and a project schedule. Within this plan, the Phase III archaeological methods will include a walkover survey/condition assessment, clearing of the work area, limited exploratory excavation, mechanized removal of the upper disturbed sediments, placement of excavation blocks, hand excavation, feature excavation, dewatering of the site, field documentation, collection of samples suited for special analysis, off-site water screening, and soil stripping. Following investigation, specialized analysis and laboratory processing of collected materials will be undertaken. Unless otherwise specified, all material will be curated at the Charlotte Capers Archives and History. Throughout the project, various form of public outreach will also be conducted (Hendryx 2012). The USACE Mobile District has also initiated consultation with the MDAH and interested federally recognized tribes. An MOA is under development and will document the final work plan, stipulations for avoidance and minimization of impacts, discovery clauses, etc. Future maintenance dredging operations would occur in previously disturbed areas and thus pose limited potential for additional impacts to the previously described cultural resource if mitigation for the resource has been completed prior to future maintenance dredging. Construction of new facilities and pipelines associated with the listed projects require coordination of any activities with the appropriate regulatory agencies, including the USACE and MDAH, as appropriate, and action taken as directed. Should any archaeological artifacts, including human remains, shipwrecks, or other cultural resources be encountered during project construction, work should cease immediately in the vicinity of the resource, the discovery reported to the USACE and MDAH, and action taken as directed.

Future maintenance dredging operations would occur in previously disturbed areas and thus pose limited potential for additional impacts to the previously described cultural resource if mitigation for this resource has been completed prior to future maintenance dredging. Construction of new facilities and pipelines associated with the listed projects may also impact the resource, requiring coordination with the appropriate regulatory agencies, including the USACE and MDAH, as appropriate, and action taken as directed. Should any archaeological artifacts, including human remains, shipwrecks or other cultural resources be encountered during project construction, work should cease immediately in the vicinity of the resource, the discovery reported to USACE and MDAH, and action taken as directed.

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7.0 ADVERSE ENVIRONMENTAL IMPACTS THAT CANNOT BE AVOIDED SHOULD THE PROPOSED PROJECT BE IMPLEMENTED

The Preferred Alternative would result in minor adverse impacts to air quality, noise levels, bathymetry of the channel and benthos and fish from the dredging and placement of dredged material and impacts would be similar to those resulting from maintenance dredging operations. All impacts except for those on bathymetry will be temporary in nature. Air emissions of major contaminants (i.e., VOC, NO_x, etc.) from dredging operations, construction vessel emissions, and on-road vehicle emissions are unavoidable, but are short-term and represent a small contribution to Jackson County emissions. Dredging operations would result in temporary minor noise level increases, but will be compatible with other industrial activities in the study area. The Preferred Alternative would result in permanent changes to the bathymetry of the 100-foot corridor to be widened; however, the alteration would be minor and the project would have a negligible effect on circulation patterns or impacts to currents, tides, or other water movements. Dredging operations from the Preferred Alternative would temporarily increase turbidity levels in the channel, with impacts on primary productivity, benthic and other aquatic organisms, such as birds and marine mammals. The Preferred Alternative would result in the permanent conversion of 87.6 acres of shallow, primarily silt and clay soft-bottom habitats to a deeper, less productive hypoxic habitat, reducing the amount of food available for aquatic organisms, some of which are federally protected species. Benthic organisms are expected to recolonize the dredged area and also the area receiving dredged material rapidly and fish, birds, and marine mammals are likely to return after dredging operations have ceased. Anticipated impacts to 22JA516 will require mitigation actions developed through an MOA between the MDAH, USACE, ACHP, and any interested federally recognized tribes.

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8.0 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES IN THE IMPLEMENTATION OF THE RECOMMENDED PLAN

Under NEPA, a review of irreversible and irretrievable effects that result from development of the proposed project is required (40 C.F.R. §§ 1500–1508). Irreversible commitments of resources are those resulting from impacts to resources so they cannot be completely restored to their original condition. Irretrievable commitments of resources are those that occur when a resource is removed or consumed and will therefore never be available to future generations for their use. For resources or subjects where irreversible or irretrievable effects would result, such effects are discussed with short- and long-term impacts. The labor, capital, and material resources expended in the planning and execution of dredging operations and dredged material placement would be irreversible and irretrievable commitments of human, economic, and natural resources. The bathymetry of the sound bottom along the Lower Pascagoula and Bayou Casotte Channels would be irretrievably altered by the widening action, but would have no permanent impacts on circulation patterns, currents, or other water movements. Energy resources used by the dredge equipment would be committed during dredging operations.

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9.0 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The proposed project would temporarily impact productivity in the study area through dredging operations and placement, which have the potential to displace or disturb wildlife and bury benthic organisms. The increased noise levels associated with dredging could disturb the daily activities of species inhabiting the study area, and the physical removal of sediment and placement would negatively impact benthic organisms. These impacts would be temporary in nature and species affected are expected to return the area following the completion of operations. A portion of the dredged material would be used for beneficial use at a designated LZA, which would help maintain sediment budgets in the project area.

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10.0 IDENTIFICATION OF THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

The goal of the alternatives analysis presented in this EIS is to identify the environmentally preferable alternative(s) (i.e., the one(s) with the least overall negative impacts to the environment). According to NEPA, the "environmentally preferable" alternative(s) promote(s) the national environmental policy. In general, the selected alternative(s) should minimize damage to the biological and physical environment while protecting, preserving, and enhancing historic, cultural, and natural resources. NEPA requires that impacts to the human environment be disclosed. Human environment "shall be interpreted comprehensively to include the natural and physical environment and the relationship of people to that environment" (40 C.F.R. 1508.14).

Two action alternatives were evaluated in this EIS: Alternative 1, or the Preferred Alternative (widening 100 feet on west side of existing channel), and Alternative 2 (widening 50 feet on either side of existing channel). The primary differences between the two alternatives include:

- Dredged volume
  - Alternative 1: 3,390,000 cy
  - Alternative 2: 3,290,000 cy
- Material for beneficial use (to LZA):
  - Alternative 1: 125,000 cy
  - Alternative 2: 315,000 cy
- Number of required ATON relocations:
  - Alternative 1: 23
  - Alternative 2: 28

As shown in Table 2.5-2 and Section 4, potential impacts from both action alternatives are the same/similar for most resources. As a cooperating agency on this EIS, the NMFS is developing a BO for potential impacts to the Gulf sturgeon and is consulting with the USACE with respect to potential impacts to Essential Fish Habitat in the project area. Anticipated impacts to 22JA516 will require mitigation actions developed through an MOA between the MDAH, USACE, ACHP, and any federally recognized tribes. These impacts and mitigative actions would be the same for the No-Action as well as both the Preferred Alternative and Alternative 2.

40 C.F.R. Part 230 Section 404(b)(1), Guidelines for Specification of Disposal Sites for Dredged or Fill Material, requires an analysis of alternatives that meet the overall project purpose, and analysis of the practicability of each alternative. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. The overall project purpose of the proposed project is defined in Section 1.4 of

the EIS as "... to improve operating conditions and efficiency in the Pascagoula Lower Sound and Bayou Casotte channels and Bayou Casotte Harbor." Two alternatives were evaluated in this EIS, and as discussed above, potential adverse impacts from both alternatives are the same/similar for most resources. Both Alternative 1 and Alternative 2 include beneficial use of dredge material. Alternative 2 provides more dredged material for beneficial use due to the characteristics of the sediment to be dredged; however, Alternative 1 provides approximately 125,000 cy of material for beneficial use for littoral zone drift and replenishment. Alternative 1 is preferred for practicability/ logistics reasons in light of the overall project purpose, including the increase in radius of turn from Horn Island Pass Channel to Lower Pascagoula Channel, and the radius of the available turning area at the entrance to the GLE dredged slip. Since Alternative 1 is more practicable, and Alternative 2 does not have less adverse environmental impact, Alternative 1 has been identified as the Environmentally Preferred Alternative.

11.0 PERMITS AND APPROVALS

This section provides an overview of laws and regulations potentially affecting the proposed project, as well as a summary of how these criteria are or will be addressed. Given the similarity of the project scope, location and regulatory impact, much of the text in this section is from the Pascagoula Harbor Navigation Channel FSEIS (USACE 2010).

CLEAN AIR ACT (CAA) (42 U.S.C 7401 et seq.)

The CAA is a comprehensive Federal law that regulates air emissions from stationary and mobile sources across the U.S. Under the CAA, the EPA develops National Ambient Air Quality Standards (NAAQS) to protect public health and to regulate emissions of hazardous air pollutants. NAAQS have been developed to maintain safe concentrations of ground-level ozone, particulate matter, nitrogen dioxide, sulfur dioxide, carbon monoxide, and lead. Pascagoula is in attainment for all NAAQS (USACE 2010).

Implementation of the CAA is primarily the responsibility of states through the development of State Implementation Plans (SIPs). These Plans outline how each state will control air pollution in accordance with the CAA. An SIP is a collection of regulations, programs, and policies that a state will use to clean up polluted areas, and is subject to EPA approval. State, local, and tribal governments also monitor air quality, inspect facilities under their jurisdictions and enforce CAA regulations (EPA 2011).

States must develop SIPs that explain how each state will implement CAA requirements via a collection of regulations. The General Conformity Rule Section 176(c) of the CAA ensures that the actions taken by Federal agencies in nonattainment or maintenance areas do not interfere with a state's plans to meet national standards for air quality. Section 309 of the CAA authorizes EPA to comment on the environmental impact of any newly authorized Federal project for construction and any other major Federal agency action significantly affecting the quality of the human environment.

The potential air quality impacts resulting from this project are discussed in Section 4, and air quality data are summarized in Appendix E. No air quality permits are anticipated to be required for this project. However, NO_x emissions for project construction activities show the project would exceed the conformity threshold (i.e., greater than 100 tpy) for 2014 and 2015. If Jackson County is designated a nonattainment area during this time period, a General Conformity Determination for NO_x emissions may be required for these years. As part of the General Conformity process, the USACE, in consultation with MDEQ and EPA, would prepare a discussion on whether emissions that would result from Alternative 2 would be in conformity with the Mississippi SIP for this area.

CLEAN WATER ACT (CWA) (33 U.S.C. 1251 et seq.)

The Federal Water Pollution Control Act of 1972, as amended in 1977 via the CWA, authorizes the EPA to regulate activities resulting in a discharge to navigable waters. Section 401 of the CWA specifies that any applicant for a Federal license or permit to conduct any activity that may discharge into navigable waters must obtain a certification that the discharge complies with applicable sections of the CWA. Section 401 of the CWA requires certification that activities, including dredge and fill activities, would not violate water quality standards. Section 401 water quality certification is obtained from the applicable state (Mississippi in this case).

Section 404 of the CWA normally requires a USACE permit for the discharge or deposition of dredged or fill material and for the building of structures in all waters of the U.S., other than incidental fallback (a term that generally refers to material falling back into waters incidentally during an activity designed to remove material, but if in doubt should be clarified during the preparation or review of a permit application). Section 404(r) of the CWA exempts from Section 404 permitting requirements the discharge of dredge or fill material as part of the construction of a Federal project specifically authorized by Congress if information on the effects of such discharge is included in an EIS pursuant to NEPA. Pursuant to the provisions of Section 404(r), the process used for completion of this project would be consistent with the guidelines described in Section 404(b)(1) of the CWA. Criteria to be considered in evaluating the alternatives include cost, technology, environmental effects, and logistics. Guidelines prepared for the evaluation of dredge and fill material also indicate that actions subject to the NEPA would, in all probability, meet the requirements of the analysis of alternatives specified by Section 404(b)(1) guidelines. As part of its review, the USACE consults with other agencies, including the USFWS and the SHPO.

Pursuant to Section 401 of the Federal Water Pollution Control Act of 1972, the USACE Mobile District will request water quality certification from the MDEQ, OPC for the proposed project. The Section 404(b)(1) evaluation report is included in Appendix F, and the Section 404 permit application is included in Appendix G.

RIVERS AND HARBORS ACT (RHA) (33 U.S.C. 407)

Section 10 of the RHA prohibits the construction of structures or obstructions in navigable waters without consent of Congress. Structures include wharves, piers, jetties, breakwaters, bulkheads, etc. The RHA also considers any changes to the course, location, condition, or capacity of navigable waters and includes dredge and fill projects in those waters. The USACE oversees implementation of this law. Permission to install a feature or conduct dredging or filling requires the approval of the Chief of Engineers. The Pascagoula Harbor Navigation Channel was established by the RHA, which was approved on October 23, 1962 (H.D. Number 560, 87th Congress).

This EIS is being completed in coordination with the USACE Mobile District, via submittal of a permit application (Appendix G) in accordance with Section 404 of the CWA, which is also being reviewed under Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the MPRSA. The NMFS and USCG have confirmed their participation as cooperating agencies for the preparation of this EIS.

MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT (MPRSA)
(16 U.S.C 1431 et seq. and 33 U.S.C. 1401 et seq.)

Titles I and II of the MPRSA, also referred to as the Ocean Dumping Act, generally prohibits (1) transportation of material from the U.S. for the purpose of ocean dumping; (2) transportation of material from anywhere for the purpose of ocean dumping by U.S. agencies or U.S.-flagged vessels; and (3) dumping of material transported from outside the U.S. into the U.S. territorial sea. A permit is required to deviate from these prohibitions (EPA 2011b).

EPA is charged with the development of ocean dumping criteria to be used during the evaluation of permit applications. The MPRSA provisions administered by EPA are published in Title 33 of the U.S. Code. The MPRSA provisions that address marine sanctuaries are administered by NOAA and are published in Title 16 of the U.S. Code.

Under Section 103 of the MPRSA, the USACE is authorized to “issue permits, after notice and opportunity for public hearings, for the transportation of dredged material for the purpose of dumping it into ocean waters, where the dumping will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities.”

This EIS is being coordinated with appropriate state and Federal agencies (see Section 14.0) in accordance with the MPRSA and includes an evaluation of the proposed project's potential impacts to resources protected under this Act. A Dredged Material Management Plan (DMMP) is included in Appendix B.

NATIONAL MARINE SANCTUARIES ACT (NMSA) (16 U.S.C. 1431 et seq.)

The NMSA, or Title III of the MPRSA, allows the Secretary of Commerce to designate any discrete area of the marine environment as a National Marine Sanctuary (NMS) if certain conditions are met regarding the site's significance, existing state and Federal protections, and size and nature. The NMSA stipulates that if a Federal action is likely to destroy, cause the loss of, or injure a sanctuary resource, the Secretary must recommend reasonable and prudent alternatives that can be used by the agency, in implementing the action that will protect sanctuary resources.

No NMSs are located near the Pascagoula Harbor. There is, however, one National Marine Reserve, Grand Bay Reserve, located approximately 2.5 to 3 miles east of the study area (USACE 2010).

ENDANGERED SPECIES ACT (ESA) (16 U.S.C. 1531–1543)

The ESA, as amended, establishes a national policy designed to protect and conserve threatened and endangered species and the ecosystems upon which they depend. The ESA is administered by the Department of the Interior, through the USFWS, and by the USDOC, through the NMFS. Section 7 of the ESA specifies that any agency that proposes a Federal action that could jeopardize the "continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species" (16 U.S.C. 1536 Section 7(a)(2)) must participate in the interagency cooperation and consultation process.

The proposed project will be reviewed by the USFWS and the NMFS to determine compliance with the ESA. After consultation, the Secretary (of Interior or Commerce or both) will issue an opinion on the action. If unacceptable adverse impacts to threatened or endangered species are identified by the USFWS or the NMFS, the Secretary will recommend reasonable alternatives (16 U.S.C. 1531 Section 7(b)(3)(A)).

Additional information regarding threatened and endangered species potentially occurring within this project area is contained in sections 3.14 and 4.14.

MAGNUSON-STEVEN FISHERY CONSERVATION AND MANAGEMENT ACT (16 U.S.C. 1801 et seq.)

The Magnuson-Steven Act provides for the conservation and management of the nation's fishery resources through the preparation and implementation of fishery management plans (FMPs) (NOAA 2011). The Magnuson-Steven Act calls for NOAA Fisheries to work with regional Fishery Management Councils to develop FMPs for each fishery under their jurisdiction.

One of the required provisions of FMPs specifies that essential fish habitat (EFH) be identified and described for the fishery, adverse fishing impacts on EFH be minimized to the extent practicable, and other actions to conserve and enhance EFH be identified. The MSA also mandates that NMFS coordinate with and provide information to Federal agencies to further the conservation and enhancement of EFH. Federal agencies must consult with NMFS on any action that might adversely affect EFH. When NMFS finds that a Federal or state action would adversely affect EFH, it is required to provide conservation recommendations.

Potential impacts on fish species and associated EFH have been evaluated in this EIS in subsections 3.12.1 and 4.12.1.

NATIONAL HISTORIC PRESERVATION ACT (NHPA) (16 U.S.C. 470 et seq.)

The NHPA, enacted in 1966 and amended in 1970 and 1980, provides for a National Register of Historic Places to include districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture. The law seeks to preserve the historical and cultural foundation of the U.S. According to Executive Order 11593, *Enhancement and Protection of the Cultural Environment*, the Federal government will provide leadership in preserving, restoring, and maintaining the historic and cultural environment. The NHPA provides funding for each state to establish a SHPO. The SHPO oversees performance of appropriate surveys to ensure that historic and cultural resources are protected under the law.

This EIS addresses the process to assure compliance with the provisions of the NHPA. Impacts to cultural and historical resources are discussed in Section 4.0. The proposed project will follow the USACE Section 404 permit application process and seek SHPO review of archaeological and historical resources and concurrence prior to operations. Compliance with Section 106 of NHPA would be required for any cultural resources located in the project area. The USACE Mobile District will consult with the MDAH on the proposed project.

COASTAL ZONE MANAGEMENT ACT (CZMA) (16 U.S.C. 1451 et seq.)

The CZMA was enacted by Congress in 1972 to develop a national coastal management program that comprehensively manages and balances competing uses of and impacts on any coastal area or resource. The program is implemented by individual state coastal management programs in partnership with the Federal government.

The CZMA outlines two national programs, the National Coastal Zone Management Program and the National Estuarine Research Reserve System. The 34 coastal programs aim to balance competing land and water issues in the coastal zone, while estuarine reserves serve as field laboratories to provide a greater understanding of estuaries and how humans impact them. The overall program objectives of CZMA are to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation’s coastal zone." (NOAA 2011b)

The CZMA emphasizes the primacy of state decision-making regarding the coastal zone. Section 307 of the CZMA, called the Federal consistency provision, is a major incentive for states to join the national coastal management program and is a powerful tool that states utilize to manage coastal uses and resources and to facilitate cooperation and coordination with Federal agencies. Federal consistency is the CZMA requirement where Federal agency activities (including Federal permits or licenses) that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone (also referred to as coastal uses or resources and coastal effects) must be consistent to the maximum extent practicable with the enforceable policies of a coastal state's federally approved coastal management program.

NOAA approved the Mississippi Coastal Program in 1980 (USACE 2010), which is comprised of a network of agencies with authority in the coastal zone. The Mississippi Department of Marine Resources (MDMR), through the Office of Coastal Ecology, is the lead agency. The primary authority guiding the Mississippi Coastal Program is the Coastal Wetlands Protection Act, which designates allowable use of the state's tidal wetlands (see State of Mississippi Regulatory Programs below). The MDMR has led a comprehensive planning effort, as described in the Comprehensive Resource Management Plan, which incorporates stakeholder interests in coastal development issues in Mississippi (NOAA 2003).

This EIS evaluates impacts to coastal resources as described in Section 4, and the MDMR consistency determination will be included as Appendix D. The USACE Mobile District will make a determination on whether the proposed project is consistent with the state's federally approved coastal management program. The USACE Mobile District will coordinate with the MDMR in making this determination.

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) (42 U.S.C. 4321–4347)

NEPA requires that all Federal agencies use a systematic, interdisciplinary approach to protect the human environment. This approach promotes the integrated use of natural and social sciences in planning and decision-making that could have an impact on the environment.

NEPA requires the preparation of an EIS for any major Federal action that could have a significant impact on the environment. The EIS must address any adverse environmental effects that cannot be avoided or mitigated, alternatives to the Proposed Action, the relationship between short-term resources and long-term productivity, and irreversible and irretrievable commitments of resources. According to 40 C.F.R. 1502.9, a supplement to either a draft or final EIS (EIS or FEIS) must be prepared if an agency makes substantial changes in the Proposed Action that are relevant to environmental concerns, or there are significant new circumstances or information relevant to environmental concerns and bearing on the Proposed Action or its impacts.

The NEPA regulations provide for the use of the NEPA process to identify and assess reasonable alternatives to proposed actions that avoid or minimize adverse effects of these actions upon the quality of the human environment. “Scoping” is used to identify the range and significance of environmental issues associated with a proposed Federal action through coordination with Federal, state, and local agencies; the general public; and any interested individuals and organizations prior to the development of an EIS. The process also identifies and eliminates, from further detailed study, issues that are not significant or have been addressed by prior environmental review.

This EIS has been prepared in accordance with the NEPA process for Federal regulatory approval of an action that may impact the environment. Specifically, this EIS evaluates the likely environmental consequences of the proposed channel widening and alternatives, as discussed in Section 4.

FISH AND WILDLIFE COORDINATION ACT OF 1934 (FWCA)
(16 U.S.C. 661–667e)

The FWCA, as amended, requires consultation and coordination with the USFWS and state fish and wildlife agencies, where “waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified” by an agency under Federal permit or license. The USACE generally requests a letter from the USFWS for new dredging projects. The USFWS letter identifies fish and wildlife resources that may be impacted by the project’s dredging and disposal operations, and identifies threatened and endangered species within the general project area.

This EIS evaluates impacts to fish and wildlife as described in Section 4. The USACE Mobile District is coordinating the proposed project with the USFWS.

MARINE MAMMAL PROTECTION ACT OF 1972 (MMPA)
(16 U.S.C. 1361 et seq.)

The MMPA established a national policy to prevent marine mammal species and population stocks from declining beyond the point where they ceased to be significant functioning elements of the ecosystems of which they are a part (NOAA 2011c). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. In the MMPA, "take" is defined as harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." The Department of Commerce, through the NMFS, is charged with protecting whales, dolphins, porpoises, seals, and sea lions. Walrus, manatees, otters, and polar bears are protected by the DOI through the USFWS. The Animal and Plant Health Inspection Service, a part of the Department of Agriculture, is responsible for regulations managing marine mammals in captivity.

Potential impacts to marine mammals are considered in Section 4 of this EIS. Incorporation of the safeguards used to protect threatened and endangered species during project implementation would also protect any marine mammals in the area; therefore, the USACE Mobile District will coordinate with the USFWS and NMFS for concurrence that the project complies with this Act.

WATER RESOURCES DEVELOPMENT ACT OF 1986 (33 U.S.C. 2316)

Improvements to the Pascagoula Harbor Navigation Channel, once the project was completed in 1965, were authorized by the WRDA of 1986 (USACE 2010). The WRDA contains an environmental protection mission, which states "that the Secretary shall include environmental protection as one of the primary missions of the Corps of Engineers in planning, designing, constructing, operating, and maintaining water resources projects."

This EIS, as well as any subsequent revisions and FEIS, demonstrate compliance with the environmental protection mission of the WRDA.

ESTUARY PROTECTION ACT OF 1968 (16 U.S.C. 1221 et seq.)

The Estuary Protection Act highlights the values of estuaries and the need to conserve their natural resources (USFWS 2011). It authorized the Secretary of the Interior, in cooperation with other Federal agencies and the States, to study and inventory estuaries of the U.S. and to determine whether such areas should be acquired by the Federal Government for protection. This report to Congress was required by January 30, 1970.

This statute also authorized the Secretary of the Interior to enter into cost-sharing agreements with States and subdivisions for permanent management of estuarine areas in their possession. Federal agencies, including USACE, were required to assess the impacts of commercial and industrial developments on estuaries. Reports submitted to Congress for such projects were required to contain an assessment by the Secretary of the Interior of likely impacts and related recommendations.

The Secretary was also required to encourage State and local governments to consider the importance of estuaries in their planning activities related to Federal natural resource grants. In approving any state grants for acquisition of estuaries, the Secretary was required to establish conditions to ensure the permanent protection of estuaries, including a condition that the lands not be disposed of without the prior approval of the Secretary.

This EIS evaluates potential impacts to estuaries as described in Section 4. The Department of Interior and other Federal and state agencies are included in the distribution of this EIS, as provided in the Estuary Protection Act.

FEDERAL WATER PROJECT RECREATION ACT
(16 U.S.C 460(L)(12)–460(L)(21))

The Federal Water Project Recreation Act, as amended, declares the intent of Congress that recreation and fish and wildlife enhancement be given full consideration as purposes of Federal water development projects if non-Federal public bodies agree to: (1) bear not less than one-half the separable costs allocated for recreational purposes or 25% of the cost for fish and wildlife enhancement; (2) administer project land and water areas devoted to these purposes; and (3) bear all costs of operation, maintenance, and replacement. Cost-sharing is not required where Federal lands or authorized Federal programs for fish and wildlife conservation are involved. This Act also authorizes the use of Federal water project funds for land acquisition in order to establish refuges for migratory waterfowl when recommended by the Secretary of the Interior, and authorizes the Secretary to provide facilities for outdoor recreation and fish and wildlife at all reservoirs under his control, except those within national wildlife refuges. The provisions of this law do not apply to projects constructed under authority of the Small Reclamation Projects Act of August 4, 1954. WRDA altered the cost-sharing provisions with respect to fish and wildlife enhancement components of projects.

This EIS evaluates potential impacts to recreational, fish and wildlife resources in Section 4.

ANADROMOUS FISH CONSERVATION ACT (AFCA) (16 U.S.C. 757a–g)

The AFCA authorizes the Secretary of Commerce, along with the Secretary of Interior, or both, to enter into cooperative agreements to protect anadromous and Great Lakes fishery resources. The term "anadromous" refers to those fish that spawn in freshwater and live most of their lives in saltwater, such as Gulf sturgeon and striped bass.

Implementation of the AFCA occurs through the NMFS within the DOC and through the USFWS within the DOI. These agencies may enter into agreements with states and other non-Federal interests to conserve, develop, and enhance anadromous fisheries. Pursuant to these agreements, the Secretary may conduct studies, collect data, make recommendations, acquire and manage lands, and accept donations for acquiring or managing lands.

Following the collection of these data, the agency makes recommendations pertaining to the elimination or reduction of polluting substances detrimental to fish and wildlife in interstate or navigable waterways. Joint NMFS and USFWS regulations applicable to this program are published in 50 C.F.R. Part 401.

Discussion of potential effects on fish and wildlife, including anadromous fish, is contained in Section 4. These effects will be reviewed by NMFS in accordance with the AFCA.

COASTAL BARRIER RESOURCES ACT (CBRA) (16 U.S.C. 3501 et seq.)

The CBRA and the Coastal Barrier Improvement Act of 1990 (PL 101-591) are Federal laws that were enacted on October 8, 1982, and November 16, 1990, respectively (FEMA 2011). The legislation was implemented as part of a DOI initiative to minimize loss of human life by discouraging development in high-risk areas, reduce wasteful expenditures of Federal resources, and preserve the ecological integrity of areas Congress designates as a Coastal Barrier Resources System (CBRS) and Otherwise Protected Areas (OPAs). The laws provide this protection by prohibiting all Federal expenditures or financial assistance, including flood insurance, for residential or commercial development in areas so identified.

The USACE Mobile District is currently consulting with the USFWS to ensure that the proposed project evaluated in this EIS is in compliance with CBRA policies.

PORTS AND WATERWAYS SAFETY ACT (PWSA)
(33 U.S.C. §§ 1221–1236 [2002])

The PWSA is designed to promote navigation, vessel safety, and protection of the marine environment. The PWSA authorizes the USCG to establish vessel traffic service/separation schemes for ports, harbors, and other waters subject to congested vessel traffic. The PWSA was amended by the Port and Tanker Safety Act (PTSA) of 1978.

Under the PTSA, Congress found that increased supervision of vessel and port operations was necessary to reduce the possibility of vessel or cargo loss, or damage to life, property, or the marine environment, and ensure that the handling of dangerous articles and substances on the structures in, on, or immediately adjacent to the navigable waters of the U.S. is conducted in accordance with established standards and requirements (U.S. Commission on Ocean Policy 2004).

Section 4 includes an evaluation of potential impacts on commercial and recreational navigation. Review of this project will be conducted by the USACE and USCG for consistency with the PWSA.

EXECUTIVE ORDER 11988, FLOODPLAIN MANAGEMENT

Executive Order 11988 requires Federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities" for the following actions:

- Acquiring, managing, and disposing of Federal lands and facilities;
- Providing Federally undertaken, financed, or assisted construction and improvements; and
- Conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities.

The USACE Mobile District will ensure that the proposed project evaluated in this EIS fully complies with this Executive Order.

EXECUTIVE ORDER 11990, PROTECTION OF WETLANDS

The purpose of Executive Order 11990 is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, this Executive Order requires Federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. The Executive Order applies to:

- Acquisition, management, and disposition of Federal lands and facilities construction and improvement projects which are undertaken, financed or assisted by Federal agencies; and
- Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities.

Effects on wetlands are discussed in Section 4 and will be considered during the review of all permits required under the CWA.

EXECUTIVE ORDER 12898, ENVIRONMENTAL JUSTICE

Environmental justice requires agencies to incorporate into NEPA documents an analysis of the environmental effects of their proposed programs on minorities and low-income populations and communities. Environmental justice is defined by EPA as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, local, and tribal programs and policies."

The potential effects resulting from this project on local populations and the resources used by local groups, including minority and low-income groups, are addressed in Section 4 of this EIS.

EXECUTIVE ORDER 13045, PROTECTION OF CHILDREN

On April 21, 1997, President Clinton issued Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. This Executive Order directs each Federal agency to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Examples of risks to children include increased traffic volumes and industrial or production-oriented activities that would generate substances or pollutants that children might come into contact with or ingest.

The potential effects of hazardous materials resulting from this project on community infrastructure and municipal services, including public safety, are addressed in Section 4.

EXECUTIVE ORDER 13186, PROTECTION OF MIGRATORY BIRDS

Executive Order 13186, signed on January 10, 2001, directs each Federal agency taking actions that are likely to have a measureable effect on migratory bird populations to develop and implement a Memorandum of Understanding with the USFWS to promote the conservation of migratory bird populations.

Potential effects on fish and wildlife, including migratory birds, are discussed in Section 4 of this EIS and will be coordinated with the USFWS.

EXECUTIVE ORDER 11593, PROTECTION AND ENHANCEMENT OF CULTURAL RESOURCES

Under Executive Order 11593, the Federal Government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the nation. Federal agencies shall: (1) administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations; (2) initiate measures necessary to direct their policies, plans and programs in such a way that federally owned sites, structures, and objects of historical, architectural or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people; and (3) in consultation with the Advisory Council on Historic Preservation (16 U.S.C. 470i), institute procedures to assure that Federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures and objects of historical, architectural or archaeological significance.

Archival research and consultation with the SHPO are being conducted in accordance with the NHPA, as amended, the Archeological and Historic Preservation Act, as amended, and Executive Order 11593.

STATE OF MISSISSIPPI REGULATORY PROGRAMS

Several of the regulatory programs above occur through explicit partnership with and/or implementation by State of Mississippi agencies. In Mississippi, the Mississippi Coastal Program oversees coastal development projects. These include the CAA (delegated to MDEQ), CWA (via joint MDMR/USACE coastal wetlands permit and MDEQ water quality certification), Magnuson-Steven Act, NHPA, NEPA, FWCA, Estuary Protection Act, AFCA, and FPPA, as described above in the summaries of each of these regulatory programs.

Mississippi guidelines include the following related to dredged material placement (USACE 2010):

- Dredged material placement sites shall be designated for initial construction as well as future maintenance dredging for all canal or channel projects (Lukens 2000, USACE 2007).
- All dredged material shall be viewed as a potential reusable resource and materials suitable for beach nourishment, construction, or other purposes shall be used immediately for such purposes or stockpiled in existing placement areas or other non-wetland areas for later use.
- Existing upland placement areas shall be used to the fullest extent possible.
- Permanent upland or deep-water placement sites shall be used in preference to coastal wetland placement.
- Areas containing submerged vegetation or regularly flooded emergent vegetation shall not be used for dredged material placement.

- New dredged material proposals shall include a maintenance plan for the shorter of 50 years or the life of the project.

COASTAL WETLANDS PROTECTION ACT (Wetlands Act) (Miss. Code Ann. § 49-27)

The Wetlands Act is intended to "favor the preservation of the natural state of the coastal wetlands and their ecosystems and to prevent the despoliation and destruction of them, except where a specific alteration of specific coastal wetlands would serve a higher public interest in compliance with the public purposes of the public trust in which coastal wetlands are held."

The Wetlands Act requires a permit from the MDMR to affect any coastal wetlands unless excluded. Regulatory considerations for the dredging of new channels include the benefit of such channel to the public at large, or to surrounding landowners, and the extent of use projected for the channel, as well as the ecological, economic, commercial, recreational and aesthetic value of the wetlands affected.

The Wetlands Act requires participation in the MDMR's Beneficial Use Program for any project permitted to remove more than 2,500 cy of material from coastal wetlands, if the material is suitable and a beneficial use site is available. In exchange for participating in the Beneficial Use Program, the MDMR reduces the fees typically charged for removal of materials from wetlands.

PUBLIC TRUST TIDELANDS LAW (PTTL) (Miss. Code Ann. § 29-15)

The PTTL is implemented by the MCMR to execute Mississippi public policy "to favor the preservation of the natural state of the public trust tidelands and their ecosystems and to prevent the despoliation and destruction of them, except where a specific alteration of specific public trust tidelands would serve a higher public interest in compliance with the public purposes of the public trust in which such tidelands are held." This policy is implemented in part through the regulatory provisions of the Wetlands Act, and in part through the authorization of leases of state public trust tidelands or submerged lands.

This EIS has been prepared in coordination with USACE, for consistency with the above State of Mississippi policies and guidelines, where appropriate.

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12.0 PUBLIC INVOLVEMENT, REVIEW, AND CONSULTATION

12.1 PUBLIC INVOLVEMENT PROGRAM

The U.S. Army Corps of Engineers (USACE), Mobile District, involved the public through public meetings and other outreach throughout the history of this project. A proactive approach was taken to inform and involve the public, resource agencies, industry, local government, and other interested parties about the project and to identify any public concerns.

On February 25, 2010, a public scoping workshop was held at the Pascagoula Library in Pascagoula, Mississippi. The purpose of the meeting was to introduce preparation of the USACE Civil Works Feasibility Study of the Proposed Bayou Casotte Harbor Channel Improvement Project (including preparation of the Environmental Impact Statement [EIS]), explain the NEPA process, and solicit public comment regarding the project.

The USACE Civil Works Feasibility Study and EIS are being prepared simultaneously with the Regulatory EIS for the permit application, and therefore the public scoping workshop will be applied to the regulatory process of the EIS. The workshop included USACE staff posted near displays containing information about the project to answer questions, and a continually running Microsoft PowerPoint presentation within the meeting room, which contained slightly more detailed information than the posters. Written and verbal comments were received at the public scoping meeting and were used to define the scope of this EIS. Other various forms of outreach utilized during this project include early regulatory agency coordination, individual contacts, press releases, and comment forms.

A public hearing for the Draft EIS was conducted on May 10, 2012, to solicit comments and information from the public. An open-house was conducted prior to the public hearing, which included a presentation and served as an opportunity for discussion with the Applicant, the USACE, and consultants on the project. Comments from the public were reviewed and responded to and are included in Appendix I.

12.2 REQUIRED COORDINATION

40 C.F.R. 1502.25 requires environmental review and consultation with appropriate agencies. As lead Federal agency in the NEPA process, USACE is responsible for coordinating with other agencies as part of the review process. This section provides an overview of laws and regulations associated with proposed dredging of the Pascagoula Lower Sound and Bayou Casotte Harbor Navigation Channel and disposal of the dredged material. Cooperating agencies for this EIS were the NMFS and USCG. NMFS addresses both EFH and threatened and endangered species. The USCG operates and administers the U.S. Aids to Navigation System under the Ports and Waterways Safety Act (1972). Permitting requirements and approvals, as well as relevant EOs are listed and described in Section 11.

Mississippi is one of 13 states in the United States that currently uses a joint permit application package to combine several state and Federal permits into one unified application or process and facilitate coordinated review by various resource agencies. In addition to agency coordination, a joint permit also provides a unified step for permit applicants. Agency regulations (developed to implement environmental laws) and relevant environmental acts (and statutes, implementing regulations) that establish standards were used to provide guidance for the proposed project and are listed in Section 11.

The EIS is being circulated to all known Federal, state, and local agencies. Interested organizations and individuals were also sent notice of availability. A list of those who were sent a copy of this document, along with a request to review and provide comments on the documents, is provided in Section 14.

Correspondence directed to and received from other agencies as part of agency coordination is summarized in Table 12.2-1, and available copies of correspondence are included in appendices D and H.

12.3 PUBLIC VIEWS AND RESPONSES

Public views and concerns expressed during this study have been considered during the preparation of this EIS. The views and concerns were used to develop the purpose and need, identify significant resources, evaluate impacts of various alternatives, and identify the environmentally preferred alternative. The DEIS was submitted for public review on April 13, 2012, and comments were incorporated to subsequent drafts and the final EIS, as outlined in Appendix I.

Table 12.2-1
Documentation of Agency Coordination with Respect to BCHIP

Agency Coordinating	Content of Coordination	Type of Coordination	Date of Response/ Notification
USACE Mobile District	Joint Public Notice SAM-2011-00389-PAH for proposed impacts to open water associated with the expansion of the Bayou Casotte Channel and Lower Mississippi Sound Channel by the Jackson County Port Authority, Pascagoula, Jackson County, MS	Public Notice	4/15/11
USACE	USACE letter to Mr. H.T. Holmes of MDAH initiating Section 106 consultation	Agency Coordination	4/18/11
MDAH	Response to USACE for cultural resources assessment determination as no effect.	Letter response to Public Notice	5/2/11
Alabama-Coushatta Tribe of Texas	Response to USACE for cultural resources assessment determination as no effect.	Letter response to Public Notice	5/9/11
MDAH	Response to USACE to consult with regard to survey and work plans for cultural resources.	Letter response to Public Notice	5/10/11
MDAH	Proposed Site Plan for the Treatment of Human Remains for the Greenwood Island Site: Proposed Pascagoula Harbor Navigation Channel widening project on Bayou Casotte	Letter response	5/29/11
USACE	Response to Allen Moeller of Jackson County Port Authority's April 6, 2011, request for DA permit.	Letter response	6/6/11
MDAH	Correspondence from Greg Williamson, Review and Compliance Officer, Mississippi Department of Archives	Letter response	7/29/11
Department of Defense – NOI	NOI to prepare an EIS for a Permit Application for Widening of Bayou Casotte and Lower Sound Channels	Federal Register / Vol. 76, No. 181	9/19/11
USACE	USACE notification to Veronica Beech of NMFS to prepare EIS	Letter response	9/23/11
USACE	USACE notification to Paul Necaise of USFWS to prepare EIS.	Letter notification	9/29/11
USACE	USACE notification to Dr. Roy Crabtree and David Keys of NMFS to prepare EIS.	Letter notification	9/29/11
USACE	USACE notification to Timothy Wendt of USCG to prepare EIS	Letter notification	9/29/11

Table 12.2-1, cont'd

Agency Coordinating	Content of Coordination	Type of Coordination	Date of Response/ Notification
USACE	USACE notification to Heinz Mueller of EPA to prepare EIS	Letter notification	9/29/11
USACE	USACE notification to Greg Williamson of MDAH to prepare EIS	Letter notification	9/29/11
NMFS	NMFS response to USACE accepting invitation to act as a cooperating agency on the project	Letter response	10/17/11
MDAH	Response to Notice of Initiation EIS stating ability to assist with Section 106 consultation	Letter response	10/27/11
USCG	Response to USACE letter indicating interest to participate as a cooperating agency.	Letter response	11/1/11
USCG	USCG letter to USACE stating concerns related to project	Letter response	1/11/12
USACE	Request to Mark Thompson of NMFS for specific information concerning EFH.	Letter request	11/16/11
USACE	Request to Ryan Hendren of NMFS / Habitat Conservation Division for specific information concerning protected species and critical habitats.	Letter request	11/16/11
USFWS	Response to Colonel Steven Roemhildt of USACE request for detailed information on protected species.	Letter response	11/29/11
USACE	USACE notification to Chief Phyliss J. Anderson of Mississippi Band of Choctaw Indians to initiate formal consultation concerning interest in or historical ties to the project area.	Letter notification	3/5/12
USACE	USACE notification copy to Kenneth H. Carleton, Cultural Resources Contact for Mississippi Band of Choctaw Indians, concerning interest in or historical ties to the project area.	Letter notification (copy)	3/5/12
USACE	USACE notification to Chairman Earl J. Barbry Sr. of Tunica-Biloxi Tribe of Louisiana to initiate formal consultation concerning interest in or historical ties to the project area.	Letter notification	3/5/12
USACE	USACE notification to Chief Christine M. Norris of Jena Band of Choctaw Indians to initiate formal consultation concerning interest in or historical ties to the project area.	Letter notification	3/5/12
USACE	USACE notification copy to Mike Tarpley, Tribal Historic Preservation Officer for Jena Band of Choctaw Indians, concerning interest in or historical ties to the project area.	Letter notification (copy)	3/5/12
USACE	USACE notification to Chief Gregory E. Pyle of Choctaw Nation of Oklahoma to initiate formal consultation concerning interest in or historical ties to the project area.	Letter notification	3/5/12

Table 12.2-1, cont'd

Agency Coordinating	Content of Coordination	Type of Coordination	Date of Response/ Notification
USACE	USACE notification copy to Dr. Ian Thompson, Tribal Archaeologist and Director of Historic Preservation for Choctaw Nation of Oklahoma, concerning interest in or historical ties to the project area.	Letter notification (copy)	3/5/12
NMFS	Biological Assessment to NMFS for review	Report	4/12
NMFS	Essential Fish Habitat Assessment to NMFS for review	Report	4/12
USACE	Notice of public hearing and availability of the DEIS	Notification	4/3/12
USACE	USACE letter to Greg Williamson of MDAH-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE letter to Carrie Barefoot of MDEQ-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE letter to Maya Rao of MDEQ-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE letter to George Ramseur of MDMR-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE letter to Ron Cole of MDMR-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE letter to Veronica Beech of NMFS-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE letter to Ryan Hendron of NMFS-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE to Paul Necaise of USFWS-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE to Heather Stratton of USCG-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE letter to Doug Johnson of EPA Region IV-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE letter to Bill Ainslie of EPA-invitation to agency workshop	Letter notification	4/3/12
USACE	USACE letter to Dawn Roberts of EPA filing the DEIS with the EPA	Letter notification	4/4/12
Department of Defense NOA	Notice of availability of the DEIS	Federal Register Vol. 77 No. 72	4/13/12
GRN	Letter to Philip Hegji of USACE, Ms. Florence Watson of MDEQ , and Mr. Ron Cole of MDMR re: PN SAM-2011-00389-PAH	Letter Response	4/26/2011
MDWFP	Response to RFI from USACE and JCPA re: SAM-2011-00389-PAH	Letter Response	4/27/2011

Table 12.2-1, cont'd

Agency Coordinating	Content of Coordination	Type of Coordination	Date of Response/ Notification
USACE	USACE notification to Veronica Beech of NMFS to initiate formal consultation concerning Section 7 of the ESA and requesting interpretation of the EFH Assessment and the BA.	Letter notification	4/30/12
USCG	Response to Philip Hegji of USACE re: PN SAM-2011-00389-PAH	Letter Response	5/6/2011
Choctaw Nation of Oklahoma	Response to USACE requesting archaeological surveys and correspondence from MSSHPO	Letter request	5/8/12
USACE	USACE notification to Mr. Nelson of ACHP of Adverse Effect on Historic Properties	Letter notification	5/15/12
USACE	USACE notification to Greg Williamson of MDAH requesting concurrence of determination of Adverse Effect on Historic Properties	Letter notification	5/15/12
EPA	EPA letter to Philip Hegji of USACE with comments on DEIS and assignment of EC-1 rating	Letter response	5/29/12
ACHP	ACHP letter to Damon Young of USACE requesting additional information to determine whether their participation is warranted	Letter request	5/31/12
MDEQ	Response to Mr. Philip Hegji of USACE and Mr. Allen Moeller of JCPA re NOI of EIS	Letter Response	6/25/2011

13.0 LIST OF PREPARERS

The USACE Project Manager for the proposed widening of the existing Pascagoula Lower Sound/ Bayou Casotte Federal Channel segment of Pascagoula Harbor (proposed project) is Philip Hegji. USACE and Atkins key personnel responsible for preparation of the document are listed below:

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Atkins		
Project Manager	Kim Fitzgibbons Project Director	16 years
Deputy Project Manager	Pam Latham Principal Technical Professional	25 Years
Principal-in-charge	Angela Bulger Group Manager	13 Years, NEPA Compliance
QA/QC Officer	Rick Medina Senior Planner IV	38 Years, NEPA, Environmental, and Water Resource Planning
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GIS Support	Philip Shad Senior Planner I	8 Years, Transportation Planner
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Bathymetry, Oceanography	Bryan Flynn Project Manager	10 Years, hydrographic survey, coastal data collection, and coastal engineering
Hydrodynamics	Paul Jensen, PE, Ph.D. Vice President, Principal Technical Professional	36 Years
Air Quality	Ruben Velasquez, PE Senior Engineer IV	23 Years, Air Quality
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Noise	Dan Doebler Senior Planner III	28 Years, Community Noise Evaluations
Water Quality, Sediments	Dave Tomasko Senior Group Manager	26 Years
Aquatic Ecology, Benthic Resources, EFH	Lisa Vitale Project Manager	15 Years
Marine T/E Species, Commercial and Recreational Fisheries	Marisa Weber Senior Scientist II	8 Years, Marine Biology and Biological Science
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Socioeconomics, Environmental Justice	Don Ator Senior Planner IV	32 Years, Socioeconomics
Land Use, Infrastructure, Aesthetics	Roger Anderson Senior Planner IV	38 Years
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Topic/Area of Responsibility	Name/Title	Experience
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16.0 GLOSSARY

Aesthetics – The subjective perception of beauty in a landscape.

Alluvial – Characterizing deposits of soil or gravel that are caused by flowing water.

Alternative Plan – A set of one of more management measures within a subprovince functioning together to address one or more objectives.

Alternatives or alternative plans – Combinations of management measures that collectively meet study goals and objectives within the defined study constraints.

Amphipods – A type of crustacean.

Amplitude – The maximum absolute value of a periodically varying quantity.

Anadromous – Ascending rivers from the sea for breeding.

Anoxia – Absence of oxygen.

Anthropogenic – Relating to, or resulting from, the influence of humans on nature (e.g., anthropogenic pollution).

Aquaculture – The science and business of farming marine or freshwater food fish or shellfish, such as oysters, crawfish, shrimp and trout, under controlled conditions.

Aquifer – An underground bed or stratum of earth, gravel, or porous stone that contains water.

Artifact – Object manufactured or altered by man. The alteration may be either by intent or by usage.

Assemblage – A collection of artifacts from a particular component, site, or group of sites.

Assessment Model – A simple mathematical tool that defines the relationship between ecosystem/landscape scale variables and either functional capacity of a wetland or suitability of habitat for species communities. Habitat Suitability Indices are examples of assessment models for which the HEAT software can be used to assess impacts/benefits of alternatives.

Astronomical Tides – Daily tides controlled by the moon, as opposed to wind-generated tides.

B.P. – Before present; in radiocarbon dating, present is calculated as A.D. 1950.

Bathymetry – The measurement of depths of water in oceans, seas, and lakes and the information derived from such measurements.

Benefits – Valuation of positive performance measures.

Benthic – Living on or in sea, lake, or stream bottoms.

Benthic biota – Aquatic bottom-dwelling organisms that include worms, leeches, snails, flatworms, burrowing mayflies, clams.

Benthos – Aquatic bottom dwelling organisms which include worms, leeches, snails, flatworms, burrowing mayflies, clams.

Best Management Practice (BMP) – An engineered structure, management activity, or a combination of, that eliminates or reduces an adverse environmental effect.

Bioaccumulation – The accumulation of contaminants in the tissues of organisms through any route, including respiration, ingestion, or direct contact with contaminated water, sediment, or dredged material.

Biomass – The total mass of living matter (plant and animal) within a given unit of environmental area.

Bottomland Hardwood Forest – Low-lying forested wetlands found along streams and rivers.

Brackish Marsh (BRM) – Intertidal plant community typically found in the area of the estuary where salinity ranges between 4 and 15 ppt.

Brackish Water – A mixture of fresh and salt water.

Carbon Dioxide (CO_2) – A colorless, odorless, nonpoisonous gas that is a normal part of the ambient air. CO_2 is a product of fossil fuel combustion, and some researchers have theorized that excess CO_2 raises atmospheric temperatures.

Chart Datum – The particular tidal level to which soundings and depth curves on a nautical chart or bathymetric map are referred. The tidal datum of Mean Lower Low Water is used on all NOAA charts, except for charts in the Great Lakes and non-tidal inland waterways.

Clean Water Act Section 404(b)(1) – There are several sections of this Act that pertain to regulating discharges into wetlands. The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Title IV (Permits and Licenses) of this Act and specifically under Section 404 (Discharges of Dredge or Fill Material) of the Act.

Coastal Zone – Coastal waters and adjacent lands that exert a measurable influence on the uses of the sea and its ecology.

Coastal Zone Consistency Determination – The U.S. Environmental Protection Agency reviews plans for activities in the coastal zone to ensure they are consistent with federally approved State Coastal Management Programs under Section 307(c)(3)(B) of the Coastal Zone Management Act.

Confined Disposal – Placement of dredged material within diked nearshore or upland confined disposal facilities (CDFs) that enclose the disposal area above any adjacent water surface, isolating the dredged material from adjacent waters during placement. Confined disposal does not refer to subaqueous capping or contained aquatic disposal.

Confluence – The intersection of two or more streams, or where one flows into another.

Constraint – A limitation or restriction on plans. Planning constraints may not be absolute restrictions but rather something to minimize or avoid.

Contaminant – A chemical or biological substance in a form that can be incorporated into, onto, or be ingested by and that harms aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment.

Continental Shelf – The edge of the continent under gulf waters; the shallow Gulf of Mexico fringing the coast.

Conveyance – The ability of a channel or other drainage element to move stormwater.

Critical Habitat – A term from the Endangered Species Act (ESA). Section 3 of the ESA defines Critical Habitat for a threatened or endangered species, in part, as: "the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of this Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of this Act, upon a determination by the Secretary that such areas are essential for the conservation of the species."

Crustacean – A group of aquatic animals characterized by jointed legs and a hard shell which is shed periodically, e.g., shrimp, crabs, crayfish, isopods, and amphipods.

Cultural Resources – Any historical or cultural feature, including archaeological sites, historic structures, shipwrecks, and artifacts.

Cumulative Impacts – The combined effect of all direct and indirect impacts to a resource over time.

Damage – This term from the Congressional language is interpreted to mean damage to real property.

Demersal – Dwelling at or near the bottom of a body of water (e.g., a demersal fish).

Deposition – The natural accumulation of soil, gravel or cultural remains laid down by natural or artificial agencies.

Depths – The vertical distance from the chart datum to the bottom and is expressed in the same units (feet, meters or fathoms) as those soundings found on the chart. See also Chart Datum.

Detritivores – Consumers of dead organic materials (detritus). Detritus feeders recycle the carbon in this material by mechanically and chemically breaking it down. During decomposition, carbon is returned to the atmosphere to be reabsorbed by living plants.

Detritus – The remains of plant material that has been destroyed or broken up.

Dewatering – The process of dredged sediments compacting while losing water after being deposited.

Direct Impacts – Those effects that result from the initial construction of a measure (e.g., marsh destroyed during the dredging of a canal). Contrast with "Indirect Effects."

Discharge – The volume of fluid passing a point per unit of time, commonly expressed in cubic feet per second, millions of gallons per day, or gallons per minute.

Dissolved Oxygen – Oxygen dissolved in water, available for respiration by aquatic organisms. One of the most important indicators of the condition of a water body.

Dissolved Solids – The total amount of dissolved material, organic and inorganic, contained in water or wastes. Excessive dissolved solids make water unpalatable for drinking and unsuitable for industrial uses.

Diurnal – Relating to or occurring in a 24-hour period; daily.

Diversion – A turning aside or alteration of the natural course or flow of water. In coastal restoration this usually consists of such actions as channeling water through a canal, pipe, or conduit to introduce water and water-borne resources into a receiving area.

Dredged Material – Material excavated from waters of the United States or ocean waters. The term dredged material refers to material that has been dredged from a water body, while sediment refers to material in a water body prior to the dredging process.

Dredged Material Embankments (Spoil Banks, Side-cast Banks, Excavated Material Banks) – Dredged material removed from canals and piled in a linear mound along the edge of canals.

DWT – Deadweight tonnage; a ship's load, including the total weight of the cargo, fuel, and stores.

Dynamic – Characterized by continuous change and activity.

Ecological – Refers to the relationship between living things and their environment.

Economic – Of or relating to the production, development, and management of material wealth, as of a country, household, or business enterprise.

Ecosystem – An organic community of plants and animals viewed within its physical environment (habitat); the ecosystem results from the interaction between soil, climate, vegetation and animal life.

Ecosystem Restoration – Activities that seek to return an organic community of plants and animals and their habitat to a previously existing or improved natural condition or function.

Ecotone – A transition area between two adjacent but different plant communities.

Effectiveness – Having an intended or expected effect. One of the USACE four requirements for a project.

Efficiency – The quality of exhibiting a high ratio of output to input. One of the USACE four requirements for a project.

Effluent – A discharge of pollutants into the environment, partially or completely treated or in its natural state. Generally used in regard to discharges into waters.

Egress – A path or opening for going out; an exit.

Electrical Conductivity – The ability of a medium to conduct electricity. Salt water has a higher electrical conductivity than fresh water, and this property allows the measurement of salinity through a simple meter.

Embankment – A linear mound of earth or stone existing or built to hold back water or to support a roadway.

Encroachment – Entering gradually into an area not previously occupied, such as a plant species distribution changing in response to environmental factors such as salinity.

Endangered Species – Animals and plants that are threatened with extinction.

Enhance – To augment or increase/heighten the existing state of an area.

Enhancement – The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Environmental Impact Statement (EIS) – A document that describes the positive and negative environmental effects of a proposed action and the possible alternatives to that action. The EIS is used by the Federal government and addresses social issues as well as environmental ones.

Ephemeral Stream – A stream which flows only during the period immediately following a rainfall and is dry for the majority of the year.

Epifauna – Benthic animals which crawl about on the sea bottom, or sit firmly attached to it.

Epiphytes – Any plant that does not normally root in the soil but grows upon another living plant while remaining independent of it except for support.

Essential Fish Habitat (EFH) – Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Establishment (creation) – The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.

Estuarine – Related to an estuary.

Estuary – A semi-enclosed body of water with freshwater input and a connection to the sea where fresh water and salt water mix.

Euryhaline – Tolerant of a wide range of salinities.

Eustatic sea level rise – Global changes in sea level.

Evaporation – The process by which any substance is converted from a liquid state into, and carried off in, vapor; as, the evaporation of water.

Evaporite – Sediments that are deposited from aqueous solution as a result of extensive or total evaporation.

Exotic Species – Animal and plant species not native to the area; usually undesirable (e.g., hyacinth, nutria, tallow tree, giant salvinia).

FCL – Full container load; used to indicate that the load carried in a container equals one of the two operating maxima: weight or volume.

Final Array – The final grouping of the most effective coast-wide plans from which a final recommendation can be made.

Flood Insurance Risk Map – Map used by the insurance industry to establish flood insurance rates for properties dependent on their location relative to the floodplain.

Floodplain – The flat, low-lying portion of a stream valley subject to periodic inundation. Residences and businesses within the floodplain are considered to be at risk of being damaged by flooding [Harris County Flood Control District (HCFCD) glossary (http://www.hcfcd.org/glossary.html)].

Fluvial Deposits – A sedimentary deposit from a river.

Foreshore Dikes – An embankment of earth and rock built to prevent floods or erosion that is built in the area of a shore that lies between the average high tide mark and the average low tide mark.

Furbearer – An animal whose skin is covered with fur, especially fur that is commercially valuable, such as muskrat, nutria, and mink.

Genus – A category of biological classification ranking between the family and the species, comprising structurally or phylogenetically (evolutionary relationship) related species and being designated by a Latin or latinized capitalized singular noun.

Geomorphic – Related to the geological surface configuration.

Geophyte – A herbaceous plant with an underground storage organ that is a reserve of carbohydrates, nutrients, and water; geophytes and can be classified as bulbs, corms, tubers, rhizomes, or tuberous roots. An analysis of geophytes from an archaeological site can aid in determining the diet of the prehistoric inhabitants of the site.

Goals – Statements on what to accomplish and/or what is needed to address a problem without specific detail.

Gradient – A slope; a series of progressively increasing or decreasing differences in a system or organism.

Groundwater – The supply of freshwater under the earth's surface in an aquifer or soil that forms the natural reservoir for man's use.

Habitat – The specific area or environment in which a particular type of plant or animal lives. An organism's habitat provides all of the basic requirements for the maintenance of life. Typical coastal habitats include beaches, marshes, rocky shores, bottom sediments, mudflats, and the water itself.

Habitat Assessment – The process by which the suitability of a site to provide habitat for a community or species is measured. This approach measures habitat suitability using an assessment model to determine HSI.

Habitat Loss – The disappearance of places where target groups of organisms live. In coastal restoration, usually refers to the conversion of marsh or swamp to open water.

Hazardous, Toxic, and Radioactive Wastes (HTRW) – Projects features must be examined to ensure that their implementation will not result in excessive exposure to pollutants possibly located in the study area.

Herbaceous – A plant with no persistent woody stem above ground.

Historical Resource – A resource possessing historical, cultural, archaeological or paleontological significance, including sites, structures, districts, and objects significantly associated with or representative of earlier people, cultures and human activities and events. Historical resources also include "historical properties," as defined in the National Historic Preservation Act, as amended 16 U.S.C. 470 et seq., and its implementing regulations, as amended.

Holocene – Geological period from about 10,000 B.C. to the present characterized by the recession of glaciers.

Hydrodynamic – The continuous change or movement of water.

Hydrogen Sulfide (H_2S) – A malodorous gas made up of hydrogen and sulfur with the characteristic of odor of rotten eggs. It is emitted in the natural decomposition of organic matter and is also the natural accompaniment of advanced stages of eutrophication. H_2S is also a byproduct of refinery activity and the combustion of oil during power plant operations. In heavy concentrations, it can cause illness.

Hydrogeomorphology – The study of the physical appearance and operational character of a waterway as it adjusts its boundaries to the magnitude of stream flow and erosional debris produced within the attendant watershed.

Hydrology – The pattern of water movement on the earth's surface, in the soil and underlying rocks, and in the atmosphere.

Hydroperiod – The period of time during which a wetland is covered by water.

Hypoxia – The condition of low dissolved oxygen concentrations.

In Situ – In original position. Normally referring to undisturbed artifacts, cultural features, or depositional layers.

Indirect Impacts – Those effects that are not as a direct result of project construction, but occur as secondary impacts due to changes in the environment brought about by the construction. Contrast with "Direct Impacts."

Infauna – Animals which live within the sediment of the sea bottom.

Infrastructure – The basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons.

Inmigrant – One who moves into or comes to live in a region or community.

Inorganic – Not derived from living organisms; mineral; matter other than plant or animal.

Interdistributary Deposits – Sand and mud deposited between the river channels or between bayous.

Intermediate Marsh (INM) – Intertidal herbaceous plant community typically found in that area of the estuary with salinity ranging from 2 to 5 ppt.

Intertidal – Alternately flooded and exposed by tides.

Intertidal Zone – The marine zone between the highest high tide point on a shoreline and the lowest tide point. The intertidal zone is sometimes subdivided into four separate habitats by height above tidal datum, typically numbered 1 to 4, land to sea.

Invertebrates – Animals without backbones, including shrimp, crabs, oysters, and worms.

Isopod – A small, flattened crustacean belonging to the order Isopoda.

Lacustrine – Of or relating to lakes.

Lagoon – A shallow body of seawater generally isolated from the ocean by a barrier island. Also the body of water enclosed within an atoll, or the water within a reverse estuary.

Land Subsidence – The sinking of the land surface.

Land-water Ratio – The relative proportion or wetlands and uplands to water in an area.

Larva (pl. larvae) – An embryo that differs markedly in appearance from its parents and becomes self-sustaining before assuming the physical characteristics of its parents.

Larvae – The stage in some animal's life cycles between egg and adult (most invertebrates).

Late Prehistoric – A general chronological and cultural stage of prehistoric North American Indians, following the Archaic and preceding the Historic, dating to ca A.D. 700 until European contact in central Texas.

Lead – A heavy metal that may be hazardous to human health if breathed or ingested.

Leeward – Sheltered from the wind; away from the wind.

Levee – A linear mound of earth or stone built to prevent a river from overflowing; a long, broad, low ridge built by a stream on its flood plain along one or both banks of its channel in time of flood.

Loamy – Soil composed of a mixture of sand, clay, silt, and organic matter.

Macroinvertebrates – An invertebrate (lacking a backbone) large enough to be seen without magnification.

Magnetic Susceptibility – The degree of magnetization of a material in response to a magnetic field. Analysis of the magnetic susceptibility of soil is used in identifying buried soil horizons.

Marsh Creation – A type of management measure that creates marsh in open water and nourishes the surrounding existing marsh. Marsh creation will include vegetation plantings. See also marsh nourishment.

Marsh Nourishment – A type of management measure that nourishes existing marsh and decreases the depth of nearby open water. See also marsh creation.

Mean Lower Low Water (MLLW) – MLLW is defined as the arithmetic mean of the lower low water height of each tidal day (24.84 hours) observed over the National Tidal Datum Epoch. The National Tidal Datum Epoch is the specific 19-year period adopted by NOAA, as the official time segment over which tide observations are taken and reduced to obtain mean values for tidal datums. The present Epoch is 1983 through 2001.

Mercury – A heavy metal, highly toxic of breathed or ingested. Mercury is residual in the environment, showing biological accumulation in all aquatic organisms, especially fish and shellfish. Chronic exposure to airborne mercury can have serious effects on the central nervous system.

Midden – The archaeologically recognized remnant of a refuse dump, usually consisting of artifacts intermixed with soil.

Mineral Substrate – Soil composed predominately of mineral rather than organic materials; less than 20 percent organic material.

Mudflats – Flat, unvegetated wetlands subject to periodic flooding and minor wave action.

National Environmental Policy Act (NEPA) – Ensures that Federal agencies consider the environmental impacts of their actions and decisions. NEPA requires all Federal agencies to consider the values of environmental preservation for all significant actions and prescribes procedural measures to ensure that those values are fully respected.

National Wetland Inventory (NWI) – The U.S. Fish and Wildlife Service is the principal Federal agency that provides information to the public on the extent and status of the nation's wetlands. The agency has developed a series of topical maps to show wetlands and deepwater habitats.

Near-shore Currents – Movement of water parallel to the shoreline. Usually generated by waves breaking on the shore at an angle other than perpendicular.

Nekton – Free-swimming organisms inhabiting the open water.

No Action Alternative – Also referred to as the future without-project condition (FWOP), the No Action Alternative describes the project area's future if there is no Federal action taken to solve the problem(s) at hand. Every alternative is compared to the same without-project condition.

National Register of Historic Places (NRHP) – A register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture maintained by the Secretary of the Interior.

Nursery – A place for larval or juvenile animals to live, eat, and grow.

Objectives – More-specific statements than "Goals," describing how to achieve the desired targets.

Oceanic-Dumping – The discharge of wastes or pollutants into offshore waters.

Open-Water Disposal – Placement of dredged material in rivers, lakes, estuaries, or oceans via pipeline or surface release from hopper dredges or barges.

Ordinary High Water Mark – The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Organic – Composed of or derived from living things.

Organism – Any living human, plant, or animal.

Oscillations – Fluctuations back and forth, or up and down.

Ostracod – A subclass of crustaceans useful as index fossils for paleoenvironmental interpretations. They have bivalved shells hinged along the dorsal margin and are usually microscopic.

Overfishing – Harvesting so many fish that there is not enough breeding stock left to replenish the species.

Oxidation of Organic Matter – The decomposition (rotting, breaking down) of plant material through exposure to oxygen.

Oxygen-Depleted – Situation of low oxygen concentrations where living organisms are stressed.

Paleoindian – The earliest identified stage of North American Indian chronology, dating from before circa 10,000 to 6500 B.C.

Paleosols – Soil horizons buried by later deposits. Often found in alluvial areas where flood deposits occur.

Palustrine – Of or related to a swamp or marsh.

Panamax – Refers to the maximum dimensions of a vessel in order to transit the Panama Canal (maximum beam of 32.3 meters or 106 feet).

Particulate Matter – Very fine solid or liquid particles in the air or in an emission, including dust, fog, fumes, mist, smoke, and spray, etc.

Polychlorinated biphenyls (PCB) – A group of organic compounds used in the manufacture of plastics. In the environment, PCBs exhibit many of the same characteristics as DDT and may, therefore, be confused with that pesticide. PCBs are highly toxic to aquatic life, they persist in the environment for long periods of time and are biologically accumulative.

Pedogenic – Pertaining to processes that add, transfer, transform, or remove soil constituents.

Pedon – The smallest volume of soil that can be recognized as a soil individual.

Pelagic – Of, relating to, or living or occurring in the open sea.

Petrochemical – Any compound derived from petroleum or natural gas.

pH – A measure of hydrogen ion concentration; a measure of the acidity or alkalinity of a solution. Aqueous solutions at 25 degrees Celsius with a pH less than seven are acidic, while those with a pH greater than seven are basic, or alkaline.

Physiography – A landscape whose parts exhibit similar geologic structures and climate, and whose pattern of topographic relief differs significantly from that of adjacent landscapes, indicating a unified geomorphic history.

Phytoplankton – Plantlike, usually single-celled members (generally microscopic) of the plankton community.

Planktivores – Organisms that feed on plankton.

Plankton – Drifting or weakly swimming organisms suspended in water. Their horizontal position is to a large extent dependent on the mass flow of water rather than on their own swimming efforts.

Planktonic – Floating in the water column.

Pleistocene – Geological period from about 3,000,000 B.C. to 10,000 B.C. characterized by the appearance and recession of glaciers.

Point-Bar Deposit – The shallow depositional area on the inside bank of a river bend.

Polychaetes – Segmented worms, mostly marine, bearing paddlelike appendages on the body segments, which, in turn, carry numerous bristles.

Post-larval – Stage in an animal's lifecycle after metamorphosis from the larval stage, but not yet fully grown.

Post-Panamax – Refers to vessels with maximum beam dimensions of 32.3 meters (106 feet) and greater (also see Panamax).

Potable Water – Water that is fit to drink.

Parts-per-thousand (ppt) – "One part per thousand" denotes one part per 1,000 parts, one part in 10^3, and a value of 1×10^{-3}. This is equivalent to one drop of water diluted into 50 milliliters (ten spoon-fulls). The salinity of ocean water is approximately 35 ppt.

Prehistoric – Human culture which existed prior to written records.

Preservation – The removal of a threat to, preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Primary Consolidation/Secondary Compression – Two processes acting on a substrate that has a load applied to it to cause the sediment to increase in density, and decrease in volume.

Prime Farmland – Land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion. One of the categories of concern in the EIS.

Producers – Photosynthetic green plant or chemosynthetic bacteria, constituting the first feeding level in a food chain.

Productivity – Growth of plants and animals.

Progradation – The phase during the deltaic cycle where land is being actively accreted through deposition of river sediments near the mouth.

Prograding – A seaward advance of the shoreline resulting from nearshore deposition of sediments.

Programmatic Environmental Impact Statement (PEIS) – An EIS that supports a broad authorization for action, contingent on more specific detailing of impacts from specific measures.

Project – A constructible increment of an alternative plan.

Pulsing – Letting a diversion flow periodically at a high rate for a short time, rather than continuously.

Quantitative – Able to assign a specific number; susceptible to measurement.

Radiocarbon Age Determination – The use of the ratio of carbon isotopes to determine age.

Radiocarbon Dating – A method of estimating the length of time since the death of an organism by measuring the radioactive decay of carbon isotopes.

Rebuild – To some extent build back a structure/landform that had once existed.

Record of Decision – A comprehensive summary required by National Environmental Policy Act that discusses the factors leading to U.S. Army Corps of Engineers (USACE) decisions on regulatory and Civil Works matters and is signed by the USACE District Engineer after completion of appropriate environmental analysis and public involvement.

Reduce – To diminish the rate or speed of a process.

Reestablishment – The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Reestablishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitate – To focus on historical or pre-existing ecosystems as models or references while emphasizing the reparation of ecosystem processes, productivity and service.

Rehabilitation – The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Relative Sea Level Rise – The sum of the sinking of the land (subsidence) and eustatic sea level change; the change in average water level with respect to the surface.

Restoration – The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: reestablishment and rehabilitation.

Restore – Return a wetland to a close approximation of its condition or function prior to disturbance by modifying conditions responsible for the loss or change; re-establish the function and structure of that ecosystem.

Riparian – The area of land along and adjacent to a waterway (river, bayou, creek, stream, etc.). Trees, plants, and grasses along these waterways are called riparian vegetation. A riparian zone from an ecological perspective may occur in many forms including, grassland, woodland, wetland or even nonvegetated. Riparian zones may be natural or engineered for soil stabilization or restoration. In some regions the terms riparian woodland, riparian forest, riparian buffer, or riparian corridor are used to characterize a riparian zone [HCFCD glossary (http://www.hcfcd.org/glossary.html)].

Riprap – Pieces of rock, broken stone, or rubble added to the surface of a fill slope, such as the side of a levee, to prevent erosion.

Riverine – Relating to or resembling a river.

Runoff – The portion of rainfall, melted snow, or irrigation water that flows across ground surface and eventually is returned to streams. Runoff can pick up pollutants from the air or the land and carry them to receiving waters.

Saline Marsh (SAW) – Intertidal herbaceous plant community typically found in that area of the estuary with salinity ranging from 12 to 32 ppt.

Salinity – The concentration of dissolved salts in a body of water, commonly expressed as parts per thousand.

Salt Marshes – See "Saline Marsh."

Saltwater Wedge – A wedge-shaped intrusion of salty ocean water into a freshwater estuary or tidal river.

Scoping – Soliciting and receiving public input to determine issues, resources, impacts, and alternatives to be addressed in the draft EIS.

Sea-Level – Long-term average position of the sea surface.

Sediment – The layer of soil, sand, and minerals at the bottom of surface water that absorbs contaminants.

Sediment Plume – Caused by sediment rich rainwater runoff entering the ocean. The runoff creates a visible pattern of brown water that is rich in nutrients and suspended sediments that forms a kind of cloud in the water spreading out from the coastline. Commonly forms at river and stream mouths, near sloughs, and along coasts where a large amount of rain runoff flows directly into the ocean.

Semivolatile Organic Compound (SVOC) – An organic compound that has a boiling point higher than water and that may vaporize when exposed to temperatures above room temperature. SVOCs include phenols and polynuclear aromatic hydrocarbons (PAHs).

Sheet Flow – Flow of water, sediment, and nutrients across a flooded wetland surface, as opposed to through channels.

Shoalgrass – Seagrass species (*Halodule wrightii*); submerged perennial, restricted to shallow, saline coastal bays.

Shoaling – The shallowing of an open-water area through deposition of sediments.

Shoreline Armoring – To protect shoreline, by covering it with erosion-resistant materials such as rock or concrete.

Short ton – The short ton is a unit of mass equal to 2,000 pounds (907.18474 kilograms).

Slough – A creek in a marsh or tide flat.

Social – Relating to human society and its modes of organization.

Socioeconomic – Involving both social and economic factors.

Sole Source Aquifer (SSA) – An aquifer that has been designated by the EPA under the Safe Drinking Water Act of 1974 as the sole or principal source of drinking water for an area.

Spoil Banks – Dredged material removed from canals and piled in a linear mound along the edge of canals.

State Historic Preservation Office (SHPO) – In Mississippi, the Historic Preservation Division of the Department of Archives & History serves at the SHPO. The division provides technical assistance and grants for preservation projects, maintains extensive lists of the state's archaeological sites and historic places, and oversees the State Historical Marker, Abandoned Cemeteries Program, Mississippi Landmark, and National Register of Historic Places programs. The division also manages Mississippi's participation in the national historic preservation program. Mississippi's historic preservation program is funded by an annual grant from the U.S. Department of the Interior matched with state funds.

Storm Overwash – The process by which sand is transposed landward over the dunes during a storm event by waves.

Storm Surge – An abnormal and sudden rise of the sea along a shore as a result of the winds of a storm.

Stormwater – Generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment, or other pollutants that could adversely affect water quality if the runoff is discharged untreated.

Stream Gaging Data – Records of water levels in streams and rivers.

Submergence – Going under water.

Submersed Aquatic Vegetation (SAV) – A fish habitat dominated by one or more species of underwater vascular plants.

Subsidence – The gradual downward settling or sinking of the Earth's surface with little or no horizontal motion.

Suitability Index (SI) – A mathematical equation that reflects a species' or community's sensitivity to a change in a limiting factor (i.e., variable) within the habitat type in HEP applications.

Sulfur Dioxide (SO_2) – one of a group of highly reactive gasses known as "oxides of sulfur." The largest sources of SO_2 emissions are from fossil fuel combustion at power plants and industrial facilities.

Superfund – The common name used for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Surface Water – Water on the earth's surface exposed to the atmosphere as rivers, lakes, streams, and oceans.

Sustain – To support and provide with nourishment to keep in existence; maintain.

Swash – The rush of water onto the beach following the breaking of a wave.

Target – A desired ecosystem state that meets and objective or set of objectives.

Terrestrial Habitat – The land area or environment where an organism lives; as distinct from water or air habitats.

Throughput – The amount of cargo that reasonably can be expected to be processed, given the physical facilities available, the operating conditions present and the business conditions characteristic of the trade in which the terminal is engaged.

Total Maximum Daily Load (TMDL) – A calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards. (http://www.epa.gov/owow/tmdl/).

Toxic Pollutant – Pollutants, or combinations of pollutants, including disease-causing agents, that after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator of the U.S. Environmental Protection Agency, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, or physical deformations in such organisms or their offspring.

Toxicity – The measure of how poisonous something is.

Transmissivity – The rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient.

Transpiration – The process by which water passes through living plants into the atmosphere.

Toxics Release Inventory (TRI) – A Federal inventory of approximately 650 harmful chemicals or classes of chemicals released to the environment or transferred off-site by specific industries in the U.S.

Turbidity – An optical measure of the amount of material suspended in the water. Increasing the turbidity of the water decreases the amount of light that penetrates the water column. High levels of turbidity may be harmful to aquatic life.

Unique Farmland – Land other than Prime Farmland (see "Prime Farmland") that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, fruits, and vegetables.

Upconing – The tendency of underground salt water to move closer to the surface in the vicinity of a well by drawing fresh ground water out.

Upland (UPL) – A general term for non-wetland elevated land above low areas along streams or between hills.

Volatile Organic Compounds (VOC) – Volatile organic compounds. Secondary petrochemicals, including light alcohols, acetone, trichloroethylene, perchloroethylene, dichloroethylene, benzene, vinyl chloride, toluene, and methylene chloride, which are used as solvents, degreasers, paint thinners, and fuels. Because of their volatile nature, they readily evaporate into the air, increasing the potential exposure to humans. Due to their low water solubility, environmental persistence, and widespread industrial use, they are commonly found in soil and groundwater.

Water Resources Development Act (WRDA) – A bill passed by Congress that provides authorization and/or appropriation for projects related to the conservation and development of water and related resources.

Waters of the U.S. – 40 C.F.R. 230.3(s). The term waters of the United States means:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters:
    - (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    - (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(iii) Which are used or could be used for industrial purposes by industries in interstate commerce;

4. All impoundments of waters otherwise defined as waters of the United States under this definition;
5. Tributaries of waters identified in paragraphs (s)(1) through (4) above;
6. The territorial sea;
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs(s) 1 through 6 above; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 C.F.R. 423.11(m), which also meet the criteria of this definition) are not waters of the United States.

Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA. (http://www.epa.gov/wetlands/guidance/CWAwaters.html).

Watershed – A geographical region of land or "drainage area" that drains to a common channel or outlet. Drainage of the land can occur directly into a bayou or creek, or through a series of systems that may include storm sewers, roadside ditches, and/or tributary channels [HCFCD glossary (http://www.hcfcd.org/glossary.html)].

Weir – A dam placed across a canal or river to raise, divert, regulate or measure the flow of water.

Wetlands – Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated-soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (40 C.F.R. Part 230), especially areas preserved for wildlife, zooplankton (planktonic animals that supply food for fish).

Zooplankton – Animal members of the plankton community.

Appendix A

Vessel Maneuvering Simulations Summary

Angola LNG Supply Services LLC

Summary of Angola LNG Supply Services

Vessel Maneuvering Simulations

10 January 2012

Summary of ALSS Vessel Maneuvering Simulations

A series of Vessel Maneuvering Simulations were conducted in 2006-08 at the Marine Simulation Institute (MSI), formerly known as the Marine Safety International's Training and Simulation Center in Newport (Middletown), Rhode Island. MSI assists clients in conducting maritime training, research, and port development studies. The Newport Center has three Full Mission Bridge Simulators, a 360 Tug Simulator, a Radar/Automatic Radar Plotting Aid (ARPA) lab, and an Electronic Chart Display and Information System (ECDIS) lab. For each set of simulations, appropriate and qualified personnel attended on behalf of ALSS, including a mix of LNG ship Captains, representatives from the Pascagoula Bar Pilots Association, tug experts, representatives from MSI and Moffat & Nichol International, and various subject matter experts from the ALSS member company organizations.

Purpose of the simulations was to conduct a series of real-time LNG carrier maneuvering simulations to evaluate the winds, waves, tides, currents and visibility of the one-way navigation channels leading to and from the Gulf LNG Energy (GLE) Terminal located on the Bayou Casotte Channel in the Port of Pascagoula, Mississippi and running approximately seven miles down the lower Pascagoula Channel, through Horn Island Pass and the Pascagoula Bar Channel to the Gulf of Mexico. The simulations were conducted using a 165,000 m3 capacity membrane LNG carrier designed to replicate the project vessels used by ALSS (vessel length ~954'; vessel width ~142.5'). A variety of weather conditions were simulated using winds of up to 20 knots with gusts and varying currently velocity profiles up to one knot (Refer to ALSS Vessel Simulations Spreadsheet for all simulation details). All data used for the channel model were gathered from publicly available information for the Pascagoula navigation channels leading to the GLE site and included both flood and ebb tides. Up to four 60 tons bollard pull Azimuth Stern Drive (ASD) tractor tugs were used in the simulations. A total of 116 vessel simulations runs were conducted over the three year period with all data from these runs summarized in the referenced spreadsheet.

October, 2006 Simulations

A series of 26 Vessel Maneuvering Simulations (of which two were calibration runs) were executed using the existing Pascagoula channel configuration, a varying number of tugs, varying the environmental conditions (wind and tide speed and direction), and various vessel speed and headings, etc. Simulation data for each run and simulation observations are summarized on the referenced spreadsheet. Simulations were considered successful when the LNG carrier navigated its course with little or no deviation from its anticipated track or stayed within a minimum of 100 feet from a fixed object in the berth maneuvering area or 50 feet from the edge of the navigation channel. Simulation observations are recorded on the spreadsheet and indicate either no channel issues or provide a brief description of observations from the particular simulation run. Sixteen of the simulation runs indicated no channel issues using the existing channel configuration.

March – April, 2007 Simulations

A total of 72 Vessel Maneuvering Simulations were conducted at MSI in March and April of 2007. Simulation data and observations are listed on the referenced spreadsheet. Three separate channel configurations were used during this series of simulations: 1) the existing 350 foot channel configuration, 2) a 500 foot wide channel, and 3) a channel configuration where the Lower Pascagoula Channel and the Bayou Casotte Channel were widened to 500 foot with the rest of the channel remaining as currently configured (referred to as 350’ Channel Modified up to 500 foot wide on the Vessel Simulations Spreadsheet).

Of the 72 simulations, 50 runs were conducted using the existing 350 foot channel model, 14 runs were conducted using the 500 foot wide channel model and eight were conducted using the 350 foot Channel Modified up to 500 foot wide. Results were recorded as either no channel navigational issues or as observations that particular issues were encountered for that simulation. As such, observations (i.e. issues) were noted 38% of the time with for the existing channel simulations runs, 28% of the time for the 500’ wide channel, and 25% of the time for the 350’ Channel Modified up to 500’wide (See spreadsheet for observation details)

April 2008 Simulations

A total of 18 Vessel Maneuvering Simulations were conducted at MSI during April of 2008. This series of simulations were conducted using three different channel configurations: 1) the existing channel, 2) a 150’ widening of Lower Pascagoula Channel (LPC) with channel flaring at Horn Island Pass (HIP), and 3) a 150’ widening of HIP with flaring and channel widening to 500’ to the west (See spreadsheet for simulations summaries using the various channel widening schemes modeled). Of the 18 simulation runs, only four were conducted using the existing channel configuration. For the 18 simulation runs, no channel issues were identified.

Summary of Simulations

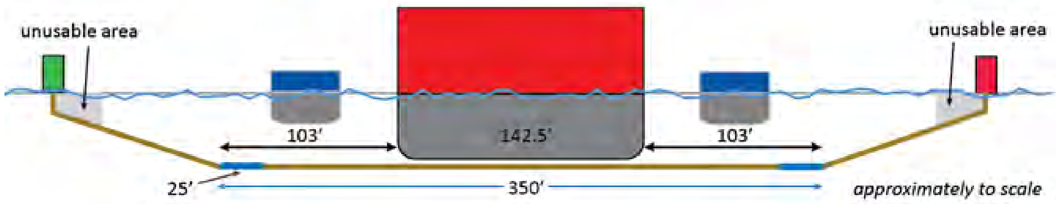
During the various sets of simulations, key areas for improvement were identified as the:

- Horn Island Pass Turns 1 and 2,
- Intersection of the Lower Pascagoula Channel with the Gulf Coast Intercoastal Waterway, and
- “Y” intersection of the Lower and Upper Pascagoula Channels and Bayou Casotte Channel.

In addition, the useable width of the channel when transited by an LNG carrier and associated tugs was determined to be 300 feet. Figure 1 below is a cross-sectional profile of the Pascagoula Channel depicting the widths of LNC vessels, tugs used to escort the LNG vessels, and the slope of the channel sides. The available area in which LNC vessels and tugs are able to operate is reduced to 300 feet from a channel width of 350 feet.

On completion of the simulations, various alternatives were considered for widening the channel ranging from selective widening on the east of the Horn Island Pass and Lower Pascagoula Channel, to adding a 150 foot flare on the east side of the Lower Pascagoula to Horn Island Pass Channel, to widening the Bayou Casotte Channel 150 feet on the west. After a review of all the simulation generated data, it was determined that widening the Bayou Casotte Channel and all of the Lower Pascagoula Channel 100 feet to the west, coupled with smoothing out the Horn Island Pass turns would provide the necessary improvements to increase the availability of the channel for vessel transit under a much wider range of environmental conditions than with the existing channel. The west side widening increases the radius of the turn from Horn Island Pass Channel to the Lower Pascagoula Channel and the radius of the available turning area at the entrance to the GLE dredged slip. This conclusion was derived from the input of pilot/tug masters involved in the simulations; debrief discussions following simulations runs, including reviews of vessel track plots; and a discussion/review of learning’s from the runs followed by recommendations by the subject matter experts.

Figure 1. Pascagoula Channel Profile



Parameter	Width in feet (meters)
Existing Channel	350 (106.7)
LNG Carrier	142.5 (43.3)
Tug	40 (12.2)
Effective Channel based on Simulations	300 (91.4)
LNG Carrier/Tug Draft	37.75/17.5 (11.5/5.33)
Channel Depth	Dredged to 42 (12.8)

While a 500 foot channel model was evaluated during some simulations, the overall conclusion was that a 450 foot wide channel would provide the necessary improvements to increase terminal availability under a much broader range of operating conditions. In deciding which option was best, the participants considered the effectiveness of the improvements along the entire transit, success in permitting the improvements with a minimum impact on the environment and the cost of improvements including adding navigation ranges to Horn Island Pass and re-alignment of the navigation ranges on the Lower Pascagoula Channel.

October 2006

Conditions						Manuevers						
Designator	**LNGC m³**	**Channel Configuration**	**Tugs (No.& BP) m/tonnes**	**Wind (Dir/Spd) (knots)**	**Tide (Dir/Spd) (knots)**	**Season**	**Start**	**Heading**	**Initial Speed**	**End**	**Simulation Observations**	
1	138,000	Existing	3 @ 60	0	0	N/A	Red Buoy 32	354º	5.0	Berth	Maneuvers performed outside slip resulted in the bow of LNGC close to west bank of channel with a tug being pinched in between the LNGC and the channel bank. One tug operated at full power for about 11 minutes while a second tug was at full power for 4 minutes.	
2	165,000	Existing	3 @ 60	0	0	N/A	Red Buoy 32	354º	7.0	Berth	No channel issues.	
3	165,000	Existing	3 @ 60	NW @ 10	Flood @ 1.0	Spring	Bayou Casotte Day Buoys	354º	7.0	Berth	No channel issues.	
4	165,000	Existing	3 @ 60	NW @ 10	Flood @ 1.0	Spring	Berth	255º	0.0	Bayou Casotte Channel	No channel issues.	
5	165,000	Existing	3 @ 60	SE @ 10	Ebb @ 1.0	Summer	Berth	255º	0.0	Bayou Casotte Channel	No channel issues.	
6	165,000	Existing	3 @ 60	SE @ 10	Flood @ 1.0	Summer	Berth	255º	0.0	Bayou Casotte Channel	No channel issues.	
7	165,000	Existing	3 @ 60	NW @ 15	Flood @ 1.0	Spring	Bayou Casotte Day Buoys	354º	5.5	Berth	No channel issues.	
8	165,000	Existing	3 @ 60	SE @ 15	Flood @ 1.0	Summer	Bayou Casotte Day Buoys	354º	5.0	Berth	No channel issues.	
9	165,000	Existing	3 @ 60	SW @ 20	Flood @ 1.0	Summer	Bayou Casotte Day Buoys	354º	5.5	Berth	LNGC came within 60 feet of the western bank of the channel during the transit. Two out of three tugs were on full power for about 3 minutes. One tug was on full power over 7 minutes.	
10	165,000	Existing	None	SE @ 20	Flood @ 1.0	Summer	Sea Buoy	42º	10.0	Bayou Casotte Day Buoys	LNGC close to Horn Island Pass once. LNGC impacted bank twice in Lower Pascagoula Channel. LNGC impacted west bank of bayou Casotte Channel upon passing "Y" and experienced loss of cushion bank.	
11	165,000	Existing	None	SW @ 20	Flood @ 1.0	Summer	Buoy 7 and 8	42º	10.0	Bayou Casotte Day Buoys	LNGC came close to edge of Lower Pascagoula Channel and within 20 feet of west bank of Bayou Casotte Channel upon passing the "Y".	
12	165,000	Existing	3 @ 60	NE @ 20	Ebb @ 1.0	Winter	Bayou Casotte Day Buoys	354º	5.5	Berth	During slip approach, LNGC came within 15 feet of west bank of Bayou Casotte Channel. All 3 tugs on full power about 18 minutes during maneuver. One tug was on full power over 21 minutes.	
13	100,000 DWT Tanker	Existing	None	0	0	N/A	Sea Buoy	42º	10.0	Bayou Casotte Day Buoys	No channel issues. Channel Calibration.	
14	165,000	Existing	None	0	0	N/A	Sea Buoy	42º	10.0	Bayou Casotte Day Buoys	No channel issues. Channel Calibration.	
15	165,000	Existing	None	SE @ 10	Flood @ 1.0	Summer	Buoy 7 and 8	42º	10.0	Bayou Casotte Day Buoys	Carrier stayed consistently on one side or other of channel. Came as close as 18 feet to channel edge. More contrast provided to allow better utilization of ranges. Still some veering of LNGC and came close to bank of Bayou Cassote Channel upong passing the "Y" and experienced a loss of bank cushion.	
16	165,000	Existing	None	SE @ 15	Flood @ 1.0	Summer	Buoy 7 and 8	42º	10.0	Pascagoula Range	No channel issues.	
17	165,000	Existing	None	SE @ 20	Flood @ 1.0	Summer	Buoy 7 and 8	42º	10.0	Pascagoula Range	LNGC came within 45 feet of bank of channel near the end of the simulation.	
18	165,000	Existing	4 @ 60	NE @ 20	Ebb @ 1.0	Fall	Bayou Casotte Day Buoys	354º	5.5	Berth	No channel issues.	

October 2006

Designator	LNGC m³	Channel Configuration	Tugs (No.& BP) m/tonnes	Wind (Dir/Spd) (knots)	Tide (Dir/Spd) (knots)	Season	Start	Heading	Initial Speed	End	Simulation Observations
Conditions						Manuevers					
19	165,000	Existing	4 @ 60	NE @ 20	Ebb @ 1.0	Fall	Bayou Casotte Day Buoys	354º	5.5	Berth	LNGC tranisited channel without incident but came within 10 feet of bank formed at junction of slip and Bayou Cassotte Channel. All 3 tugs on full power about 10 minutes. One tug on full power over 15 minutes.
20	165,000	Existing	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Bayou Casotte Day Buoys	354º	4.0	Berth	No channel issues.
21	165,000	Existing	3 @ 60	E @ 20	Flood @ 1.0	Fall	Buoy 7 and 8	44º	10.0	Berth	LNGC came within 35 feet of east of channel ince it passed the "Y" and experirenced loss of bank suction. Just sout of "Y" the pilot made up 3 tugs for tansit. Reminder of transit and maneuver without incident. Full power used on 2 tugs for 2 minutes.
22	165,000	Existing	3 @ 60	SE @ 15	Flood @ 1.0	Summer	Berth	73º	0.0	Channel	No channel issues.
23	165,000	Existing	3 @ 60	SE @ 15	Flood @ 1.0	Summer	Berth	73º	0.0	Channel	No channel issues.
24	165,000	Existing	3 @ 60	SE @ 15	Flood @ 1.0	Summer	Berth	73º	0.0	Channel	No channel issues.
25	165,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Spring	Bayou Casotte Day Buoys	354º	4.0	Berth	No channel issues.
26	165,000	Existing	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 7 and 8	44º	10.0	Bayou Casotte Day Buoys	LNGC lowered initial speed to 8 knots. Through Horn Island Pass LNGC greater set and drift than simulations at higher speeds. LNGC ran aground at "Y".

March - April 2007

Designator	LNGC m³	Channel Configuration	Tugs (No.& BP) m/tonnes	Wind (Dir/Spd) (knots)	Tide (Dir/Spd) (knots)	Season	Start	Heading	Initial Speed (knots)	End	Simulation Observations
Conditions						Manuevers					
1	138,000	Existing	3 @ 60	NW @ 20	Flood @ 1.0	Winter	Sea Buoy	40º	10.0	Beacons 3 & 4	No channel issues.
2	165,000	Existing	3 @ 60	NW @ 20	Flood @ 1.0	Winter	Buoy 7 and 8	40º	10.0	Beacons 5 & 6	After passing Day Beacons 1 and 2 the aft tug provided inline direct pull at 30 tonnes. The aft tug was reduced to a direct pull of 20 tonnes at Day Beacon 3 and 4.
3	138,000	Existing	3 @ 60	NW @ 20	Flood @ 1.0	Winter	Sea Buoy	40º	10.0	Beacons 3 & 4	Pilot was not familiar with currents. One tug made up centerline aft just north of Buoys 20 and 21 as LNGC entered LPC. Near buoys 23 and 24 aft tug had a direct pull inline at 30 tonnes. LNGC set towrd the east and crossed the 30 feet boundary line just north of GIWW but did not move outside 52 feet boundary line. A hard right rudder was used to counter the low pressure @ the "Y" and then a hard port rudder was required to stop swing. Just south of "Y" 2 additional tugs were made up for transit, one on each shoulder.
4	165,000	Existing	3 @ 60	NW @ 20	Flood @ 1.0	Winter	Buoy 7 and 8	42º	10.0	LNGC down to 5.2 kkots.	LNGC crossed the 52 foot channel line at the first HIP turn because rate of turn was too high. One tug was made up aft near Buoys 25 and 26. Near Buoys 27 and BB the aft tug was at direct pull inline at 20 tonnes; reducing to 10 tonnes once past the GIWW. Speed of 5.5 knots at GIWW was not great enough and pilot crossed the 52 feet boundary line. Pilot recommended speed of 7 to 8 knots. Two more tugs added, one each shoulder, just south of "Y". After LNGC passed "Y" aft tug was inline with 10 to 20 tonnes slowing LNGC to 5.2 knots.
5	154,000	Existing	3 @ 60	NW @ 20	Flood @ 1.0	Winter	Buoy 7 and 8	42º	10.0	Beacons 3 & 4	No channel issues.
6	154,000	Existing	3 @ 60	NW @ 20	Flood @ 1.0	Winter	Buoy 7 and 8	42º	10.0	Beacons 3 & 4	No channel issues.
7	138,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 7 and 8	40º	10.0	Beacons 3 & 4	No channel issues.

March - April 2007											
Conditions						Manuevers					
Designator	LNGC m³	Channel Configuration	Tugs (No.& BP) m/tonnes	Wind (Dir/Spd) (knots)	Tide (Dir/Spd) (knots)	Season	Start	Heading	Initial Speed (knots)	End	Simulation Observations
8	138,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 5 and 6	40º	10.0	Beacons 3 & 4	One tug was made center lead aft just north of Buoys 20 and 21. Prior to approaching Buoys 33 and 34 the tug was commanded to provide a direct pull inline at 20 tonnes. LNGC crossed the 52 feet boundary line on west side of LPC by 3 to 4 feet. Two additionals tugs were made up just south of "Y".
9	165,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 5 and 6	40º	10.0	Beacons 3 & 4	No channel issues.
10	165,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 5 and 6	40º	10.0	Beacons 3 & 4	First tug made up center lead aft near Buoys 23 and 24. Transit speed for LPC about 8.2 knots. LNGC passed over the 52 feet channel line near the GIWW because an inexperienced helmsman applied the wrong rudder angle. Pilot caught error and recovered but not before crossing the channel line. Near Buoys 31 and 32 tug wa in direct pull inline at 20 tonnes. Two more tugs were made up, one on each shoulder, just south of "Y".
11	165,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 7 and 8	40º	10.0	Buoy 27 and BB	No channel issues.
12	138,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 7 and 8	40º	10.0	Buoy 27 and BB	No channel issues.
13	138,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 7 and 8	40º	10.0	Buoy 27 and BB	No channel issues.
14	138,000	Existing	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	40º	10.0	Beacons 3 & 4	No channel issues.
15	165,000	Existing	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Sea Buoy	40º	10.0	Beacons 1 & 2	No channel issues.
16	165,000	Existing	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	10.0	Beacons 3 & 4	No channel issues.
17	138,000	Existing	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	10.0	Buoy 27 & BB	No channel issues.
18	138,000	Existing	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	10.0	Buoy 27 & BB	No channel issues.
19	165,000	Existing	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	10.0	Buoy 27 & BB	While making the second Horn Island Pass turn the carrier clipped the corner passing over the 30 feet boundary ine. The pilots commentd that the error was due to fatigue. One tug was made fast through the center lead aft, inline slack at Buoys 25 and 26. The tugs were never used during the simulation.
20	138,000	Existing	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Sea Buoy	41º	10.0	Beacons 3 & 4	Tug made up center line aft and directed to pull inline at 20 to 30 tonnes near Buoys 23 and 2, just north of second Horn Island Pass turn. LNGC crossed the 30 foot channel line at Buoys 29 and 30 near GIWW. Two tugs were made up just south of the "Y", one on each side of bow. Transit speed through "Y" was 7.0 knots and decreased to 6.5 knots when entering Bayou Casotte channel. Pilot stated that LNGC was not positioned correctly for currents near GIWW.
21	138,000	Existing	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 7 and 8	41º	10.0	Beacons 1 & 2	LNGC crossed over toe of slope near Buoys 23 and 24 just north of second Horn Island Pass turn. Tug was made up center line aft and directed to pull inline at 20 tonnes afte LNGC went outside channel. LNGC passed the GIWW at 8 knots and approached the "Y" at 8.4 knots. Two tugs made up just south of "Y", one on each shoulder.
22	138,000	Existing	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 7 and 8	41º	10.0	Buoy 23 & 24	LNGC crossed over toe of slope near Buoys 23 and 24 just north of Horn Island turns.
23	138,000	Existing	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 7 and 8	41º	10.0	Beacons 3 & 4	No channel issues.
24	165,000	Existing	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 7 and 8	41º	10.0	Beacons 1 & 2	LNGC crossed over the 52 feet channel line near Buoys 23 and 24, just north of Horn Island turns. A tug was made up center line aft and directed to pull inline at 30 tonnes after LNGC crossed over the 52 feet channel line. Two tugs were made up just south of "Y", one on each side of bow. LNGC passed through "Y" at 6.5 knots.
25	165,000	Existing	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 7 and 8	41º	10.0	Buoy 31 & 32	No channel issues.
26	138,000	Existing	3 @ 60	W @ 20	Flood @ 1.0	Spring	Buoy 5 and 6	41º	10.0	Buoy 23 & 24	LNGC crossed over the 30 feet channel line near Buoys 23 and 24 just north of the Horn Island turns.

March - April 2007											
Conditions						Manuevers					
Designator	LNGC m³	Channel Configuration	Tugs (No.& BP) m/tonnes	Wind (Dir/Spd) (knots)	Tide (Dir/Spd) (knots)	Season	Start	Heading	Initial Speed (knots)	End	Simulation Observations
27	138,000	Existing	3 @ 60	W @ 20	Flood @ 1.0	Spring	Buoy 5 and 6	41º	10.0	Beacons 1 & 2	LNGC transited through first Horn Island Pass turn at 10 knots and reduced speed to 9.1 knots to Buoys 23 and 24, just north of Horn Island turns. A tug was made up center line aft and directed to pull inline 20 tonnes near Buoys 23 and 24. LNGC crossed over the 52 foot channel line near the GIWW. Two tugs were made up just south of "Y", one on each side shoulder.
28	165,000	Existing	3 @ 60	W @ 20	Flood @ 1.0	Spring	Buoy 5 and 6	41º	10.0	Beacons 1 & 2	No channel issues.
29	165,000	Existing	3 @ 60	W @ 20	Flood @ 1.0	Spring	Buoy 5 and 6	41º	10.0	Beacons 1 & 2	LNGC entered first Horn Island Pass turn at 7.0 knots. Tug was made up centerline aft with a direct pull inline at 20 tonnes prior to first HIP turn. Once LNGC steady in HIP the aft tug was directed to slack line. LNGC transited through second HIP at 6.3 knots. Two tugs were made up centerline bow just north of HIP turns. LNGC did not recover rate of turn after the second HIPs turn and transited outside west bank toe slope.
30	165,000	Existing	3 @ 60	W @ 20	Flood @ 1.0	Spring	Buoy 5 and 6	41º	10.0	Beacons 1 & 2	Pilot started simulation at 9 knots. LNGC entered first Horn Island Pass turn at 7.1 knots. Tug was made up centerline aft after first Horn Island Pass turn with a direct pull inline at 20 tons. Two tugs were made up centerline on bow near Buoys 23 and 24. After second Horn Island Pass the LNGC swung to port side and transited outside the 52 foot channel line south of Buoys 25 and 26. LNGC went outside of east bank toe of slope near the GIWW. LNGC transited through the "Y" at 6.3 knots.
31	165,000	500' Wide Channel	3 @ 60	W @ 20	Flood @ 1.0	Spring	Buoy 5 and 6	41º	10.0	Beacons 1 & 2	No channel issues.
32	165,000	500' Wide Channel	3 @ 60	W @ 20	Flood @ 1.0	Spring	Buoy 5 and 6	41º	10.0	Buoy 25 & 26	LNGC transited first Horn Island Pass turn at 7.3 knots and the second turn at 6.5 knots. Tug was made centerline aft near Buoys 23 and 24. LNGC transited outside of 75 foot channel line near Buoys 23 and 24, just north of Horn Island Pass turns. This was first exercise the pikot had experienced with the 500' wide channel.
33	165,000	500' Wide Channel	3 @ 60	W @ 20	Flood @ 1.0	Spring	Buoy 5 and 6	41º	10.0	Beacons 1 & 2	No channel issues.
34	138,000	500' Wide Channel	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	10.0	Beacons 1 & 2	No channel issues.
35	138,000	500' Wide Channel	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	10.0	Beacons 1 & 2	No channel issues.
36	165,000	500' Wide Channel	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	10.0	Beacons 1 & 2	No channel issues.
37	165,000	500' Wide Channel	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 3 and 4	180º	5.0	Buoy 9 & 10	No channel issues.
38	138,000	500' Wide Channel	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 3 and 4	180º	5.0	Buoy 9 & 10	No channel issues.
39	165,000	500' Wide Channel	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 3 and 4	180º	5.0	Buoy 9 & 10	Pilot started simulation with intial speed of 5 knots with a tug made centerline aft. LNGC transited past GIWW at about 5.2 knots. First Horn isalnd Pass turn was made a little late and LNGC crossed over 75 foot boundary line on east bank. Then too much rudder was used and LNGC transited outside of the 75 foot boundary line near the second Horn Island Pass turn.
40	165,000	500' Wide Channel	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 3 and 4	180º	5.0	Buoy 9 & 10	No channel issues.
41	138,000	500' Wide Channel	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 3 and 4	180º	5.0	Buoy 19 & 20	Pilot started simulation at 5 knots with a tug made up centerline aft. Aft tug provided direct pull at 20 tons near Buoys 35 and 36. LNGC transited GIWW at about 7.8 knots and first Horn Island Pass turn at about 7.5 knots. Rate of turn for the first Horn Island Pass turn could not be recovered and LNGC transited outside west bank toe of slope caused by pilot fatigue.

March - April 2007											
Conditions						Manuevers					
Designator	LNGC m³	Channel Configuration	Tugs (No.& BP) m/tonnes	Wind (Dir/Spd) (knots)	Tide (Dir/Spd) (knots)	Season	Start	Heading	Initial Speed (knots)	End	Simulation Observations
42	138,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Beacons 3 and 4	180º	5.0	Buoy 16	Pilot started simulation with speed of 5 knots with a tug made centerline aft. Aft tug had 20 tons direct pull inline near Beacons 1 and 2. LNGC transited GIWW at about 8.3 knots. Aft tug direct pull increased to 50 tons near Buoys 25 and 26. LNGC transited first Horn Island Pass turn at about 7.5 knots. Rate of turn for first Horn Island Pass turn could not be overcome and LNGC transited outside west bank toe of slope.
43	138,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Beacons 3 and 4	180º	5.0	Buoy 11 & 12	Pilot started simulation with speed of 8 knots and a tug made up centerline aft with a direct pull inline at 40 tons. LNGC transited first Horn Island Pass turn at about 8.2 knots. Second HornIsland Pass turn was made too late and LNGC crossed over the toe of slope on east bank.
44	165,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Beacons 3 and 4	180º	5.0	Buoy 9 & 10	No channel issues.
45	165,000	Existing	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Berth	255º	0.0	Beacons 5 & 6	No channel issues.
46	165,000	Existing	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Berth	255º	0.0	Beacons 5 & 6	No channel issues.
47	138,000	Existing	3 @ 60	W @ 20	Ebb @ 1.0	Winter	Buoy 5 and 6	41º	9.0	Beacons 1 & 2	LNGC transited first HIP turn at 9.7 knots and second turn at 9.3 knots. A tug was made up centerline aft near Buoys 23 and 24 and provided a direct inline pull of 30 tonnes. LNGC set to east at GIWW and crossed the 52 foot channel line. Two tugs were made up just south of "Y", one on each shoulder. LNGC passed "Y" at 5.0 knots.
48	165,000	500' Wide Channel	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	LNGC entered first Horn Island Pass turn at 7.2 knots. LNGC crossed over 75 foot boundary line on east bank near first Horn Island Pass turn. LNGC transited second Horn Island Pass at 6.2 knots. Tug was made up centerline aft near Buoys 23 and 24 with an inline slack line. LNGC transited past the GIWW at 6.8 knots. The tug was not used in the simulation.
49	165,000	500' Wide Channel	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	No channel issues.
50	165,000	500' Wide Channel	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	No channel issues.
51	138,000	Existing	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	LNGC tranisted first HIP turn at 8.2 knots. LNGC entered second HIP turn at 7.2 knots. After finishing the second turn, LNGC transited outside of the 52 foot channle line on east bank. Tug was made centerline aft near Buoys 23 and 24 and directed to pull inline at 20 tonnes. LNGC transited past GIWW at 6.9 knots.
52	138,000	350' Channel Modified up to 500' wide	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 23 & 24	No channel issues.
53	138,000	350' Channel Modified up to 500' Wide	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	No channel issues.
54	138,000	350' Channel Modified up to 500' Wide	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 23 & 24	Pilot entered first HIP turn at 8.2 knots. During second turn the LNGC hugged west channel and current caught port bow. LNGC crossed over east bank toe of slope just after the HIP turns.
55	138,000	350' Channel Modified up to 500' Wide	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 31 & 32	No channel issues.
56	138,000	350' Channel Modified up to 500' Wide	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	No channel issues.
57	165,000	350' Channel Modified up to 500' Wide	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	Pilot started simulation with speed of 9 knots and a tug made up centerline aft. LNGC transited first Horn Island Pass turna at about 8.5 knots and second Horn Island Pass turn at 7.5 knots. Near Buoys 25 and 26 the aft tug's direct pull was reduced to slack line. Just prior to GIWW the aft tug provided a direct inline pull of 30 tons. LNGC approached GIWW at .5 knots and went outside of 30 foot channel boundary line at GIWW.
58	165,000	350' Channel Modified up to 500' Wide	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	No channel issues.
59	165,000	350' Channel Modified up to 500' Wide	3 @ 60	W @ 20	Flood @ 1.0	Spring	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	No channel issues.

March - April 2007

Conditions						Manuevers					
Designator	LNGC m³	Channel Configuration	Tugs (No.& BP) m/tonnes	Wind (Dir/Spd) (knots)	Tide (Dir/Spd) (knots)	Season	Start	Heading	Initial Speed (knots)	End	Simulation Observations
60	138,000	350' Wide Channel	3 @ 60	W @ 20	Flood @ 1.0	Spring	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	Pilot started simulation at 9 knots and a tug made up centerline aft. LNGC traveled through first Horn Island Pass turn at 10.0 knots and the second turn at 10.5 knots.LNGC crossed the 52 foot channel line near Buoy 23 and 24.
61	165,000	350' Wide Channel	3 @ 60	W @ 20	Ebb @ 1.0	Spring	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	No channel issues.
62	138,000	350' Wide Channel	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 5 and 6	41º	9.0	Buoy 29 & 30	No channel issues.
63	138,000	350' Wide Channel	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Beacons 5 and 6	180º	5.0	Buoy 9 & 10	No channel issues.
64	165,000	350' Wide Channel	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Beacons 3 and 4	180º	5.0	Buoy 9 & 10	No channel issues.
65	138,000	Existing	3 @ 60	SE @ 20	Ebb @ 0.5	Summer	Buoy 7 and 8	41º	9.0	Buoy 29 & 30	No channel issues.
66	165,000	Existing	3 @ 60	SE @ 20	Ebb @ 0.5	Summer	Buoy 7 and 8	41º	9.0	Buoy 29 & 30	No channel issues.
67	165,000	Existing	3 @ 60	NW @ 20	Ebb @ 0.5	Winter	Buoy 7 and 8	41º	9.0	Buoy 23 & 24	No channel issues.
68	138,000	Existing	3 @ 60	NW @ 20	Ebb @ 0.5	Winter	Buoy 7 and 8	41º	9.0	Buoy 25 & 26	No channel issues.
69	138,000	Existing	3 @ 60	NW @ 20	Flood @ 0.5	Winter	Buoy 7 and 8	41º	9.0	Buoy 25 & 26	No channel issues.
70	165,000	Existing	3 @ 60	NW @ 20	Flood @ 0.5	Winter	Buoy 7 and 8	41º	9.0	Buoy 25 & 26	No channel issues.
71	165,000	Existing	3 @ 60	NW @ 20	Ebb @ 0.5	Winter	Buoy 27 and BB	174º	7.5	Buoy 11 & 12	No channel issues.
72	138,000	Existing	3 @ 60	NW @ 20	Ebb @ 0.5	Winter	Buoy 27 and BB	174º	7.5	Buoy 11 & 12	No channel issues.

April 2008

Conditions						Manuevers					
Designator	LNGC m³	Channel Configuration	Tugs (No.& BP) m/tonnes	Wind (Dir/Spd) (knots)	Tide (Dir/Spd) (knots)	Season	Start	Heading	Initial Speed (knots)	End	Simulation Observations
1	138,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 7 and 8	41º	8.0	Berth	No channel issues. Demonstration run.
2	138,000	150' Widening of LPC with Flare @ HIP	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 7 and 8	41º	8.0	Buoy 27 and BB	No channel issues. Demonstration run.
3	138,000	with Flare @ HIP and 500' Widening of BCC	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 7 and 8	41º	8.0	Berth	No channel issues. Demonstration run.
4	138,000	Existing	3 @ 60	E @ 12	Flood @ 0.5	Spring	Buoy 7 and 8	41º	10.0	Berth	No channel issues. Familiarization run.
5	138,000	Existing	3 @ 60	E @ 12	Flood @ 0.5	Spring	Buoy 7 and 8	41º	10.0	Beacons 1 & 2	No channel issues. Familiarization run.
6	138,000	Existing	3 @ 60	NW @ 20	Flood @ 1.0	Winter	Buoy 7 and 8	41º	10.0	Beacons 1 & 2	No channel issues.
7	138,000	Existing	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 7 and 8	41º	10.0	Beacons 1 & 2	No channel issues.
8	138,000	150' Widening of HIP with Flare @ HIP and 500' Widening of BCC	3 @ 60	NW @ 20	Flood @ 1.0	Winter	Buoy 7 and 8	41º	10.0	Berth	No channel issues.
9	138,000	150' Widening of HIP with Flare @ HIP and 500' Widening of BCC	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 7 and 8	41º	10.0	Beacons 3 & 4	No channel issues.

April 2008											
Conditions						Manuevers					
Designator	LNGC m³	Channel Configuration	Tugs (No.& BP) m/tonnes	Wind (Dir/Spd) (knots)	Tide (Dir/Spd) (knots)	Season	Start	Heading	Initial Speed (knots)	End	Simulation Observations
10	138,000	150' Widening of HIP with Flare @ HIP and 500' Widening of BCC	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Buoy 7 and 8	41º	10.0	Beacons 3 & 4	No channel issues.
11	138,000	150' Widening of HIP with Flare @ HIP and 500' Widening of BCC	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 7 and 8	41º	10.0	Berth	No channel issues.
12	138,000	150' Widening of HIP with Flare @ HIP and 500' Widening of BCC	3 @ 60	SE @ 20	Ebb @ 1.0	Summer	Berth	255º	0.0	Buoy 7 & 8	No channel issues.
13	138,000	150' Widening of HIP with Flare @ HIP and 500' Widening of BCC	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Buoy 27 and BB	174º	10.0	Buoy 7 & 8	No channel issues.
14	138,000	150' Widening of HIP with Flare @ HIP and 500' Widening of BCC	3 @ 60	NW @ 20	Ebb @ 1.5	Winter	Buoy 7 and 8	41º	10.0	Buoy 25 & 26	No channel issues.
15	138,000	150' Widening of LPC with Flare @ HIP	3 @ 60	NW @ 20	Ebb @ 1.0	Winter	Buoy 7 and 8	41º	10.0	Buoy 25 & 26	No channel issues.
16	138,000	150' Widening of LPC with Flare @ HIP	3 @ 60	NW @ 20	Ebb @ 1.5	Winter	Buoy 25 and 26	174º	10.0	Buoy 11 & 12	No channel issues.
17	138,000	150' Widening of LPC with Flare @ HIP	3 @ 60	SE @ 20	Flood @ 1.0	Summer	Berth	174º	10.0	Buoy 9 & 10	No channel issues.
18	138,000	150' Widening of LPC with Flare @ HIP	3 @ 60	SE @ 20	Ebb @ 1.5	Summer	Buoy 7 and 8	41º	10.0	Buoy 25 & 26	No channel issues.

Appendix B

Dredged Material Management

DREDGED MATERIAL MANAGEMENT PLAN
PORT OF PASCAGOULA
BAYOU CASOTTE AND LOWER SOUND CHANNEL WIDENING PROJECT

Prepared for

Jackson County Port Authority – Port of Pascagoula

Prepared by

Anchor QEA, LLC
614 Magnolia Avenue
Ocean Springs, Mississippi 39564

July 2012

DREDGED MATERIAL MANAGEMENT PLAN PORT OF PASCAGOULA BAYOU CASOTTE AND LOWER SOUND CHANNEL WIDENING PROJECT

Prepared for

Jackson County Port Authority – Port of Pascagoula

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July 2012

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LIST OF ACRONYMS AND ABBREVIATIONS

2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
Anchor QEA	Anchor QEA, LLC
BU	beneficial use
CFR	Code of Federal Regulations
cy	cubic yards
DMMP	Dredged Material Management Plan
DMMS	Dredged Material Management Site
EA	EA Engineering, Science, and Technology, Inc.
EC_{50}	median effective concentration
EIS	Environmental Impact Statement
ERDC-EL	USACE Engineer Research and Development Center Environmental Lab
ERED	Environmental Residue-Effects Database
FNC	Federal Navigation Channel
HpCDD	heptachlorodibenzo-p-dioxin
JCPA	Jackson County Port Authority
LC_{50}	median lethal concentration
LNG	Liquefied Natural Gas
LPC	limiting permissible concentration
LZA	Littoral Zone Area
mcy	million cubic yards
MDMR	Mississippi Department of Marine Resources
MLLW	mean lower low water
MPRSA	Marine Protection, Research, and Sanctuaries Act
NED	National Economic Development Plan
ng/kg	nanograms per kilogram
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOED	no observable effects dose
OCDD	octachlorodibenzo-p-dioxin
ODMDS	Offshore Dredged Material Disposal Site
PAH	polycyclic aromatic hydrocarbon

PCB	polychlorinated biphenyl
PEL	probable effects level
Plan	Master Plan for the Beneficial Use of Dredged Material for Coastal Mississippi
Project	Bayou Casotte and Lower Pascagoula Sound Channel Widening Project
SERIM	Southeast Regional Implementation Manual
SM	silty sand
SMMP	Site Management and Monitoring Plan
SP	poorly graded clean sand
SQG	sediment quality guidelines
STFATE	Short-Term FATE
SVOC	semivolatile organic compound
TEL	threshold effects level
TEQ	toxicity equivalency quotient
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFDA	U.S. Food and Drug Administration
WQC	water quality criteria
WRDA	Water Resources and Development Act

EXECUTIVE SUMMARY

This dredged material management plan (DMMP) evaluates the dredging and placement options available for the proposed Bayou Casotte and Lower Pascagoula Sound Channel Widening Project (the Project) at the Port of Pascagoula (the Port). Concurrently, the U.S. Army Corps of Engineers (USACE) is evaluating assuming maintenance of the widened Project under a Section 204(f) study. If the USACE evaluation is favorable and adopted, the Project will be constructed; if not, the Project will not be constructed.

The Port's selected alternative is to widen the channel 100 feet to the west for approximately 7.2 miles, based on input from the local pilots, ship simulation studies conducted by Liquefied Natural Gas (LNG) carriers and other navigating professionals. The total dredging volume for the selected option is approximately 3.39 million cubic yards (mcy), with approximately 125,000 cubic yards (cy) of the volume being predominately sand.

A total of six alternatives were evaluated for the new work dredged material placement. Two of the six alternatives were found to present feasible options for dredged material placement: the Pascagoula Offshore Dredged Material Disposal Site (ODMDS) and the offshore Littoral Zone Area (LZA) southeast of Horn Island. The latter option presents an opportunity for the beneficial use (BU) of the dredged material; however, the sediments placed in the LZA must consist of predominantly sands. As a result, this option is only viable for a portion (125,000 cy) of the estimated new work volume. Based on planning-level estimates by the U.S. Army Corps of Engineers (USACE), the cost difference associated with each placement option is negligible.

1 BACKGROUND

The U.S. Army Corps of Engineers (USACE) and the Port of Pascagoula (Port) are currently preparing two Environmental Impact Statements (EIS). The Regulatory EIS will assess the effects of the Bayou Casotte and the Lower Pascagoula Sound Channel Widening Project (the Project), and the long-term maintenance of the proposed Project will be addressed by the Planning EIS. The Project proposes to widen the Bayou Casotte Channel and the Lower Sound Channel a total of 100 feet along the entire length and construct a bend easing at the Horn Island Pass channel intercept. The channel widening would provide greater accessibility to all vessels calling at the public and private facilities located in the Bayou Casotte Harbor. The Project would also have a net benefit to all vessel traffic operating within these channels, as the increased width will provide for greater utilization.

1.1 Site Location and Description

The Port is located in Jackson County Mississippi in the City of Pascagoula (Figure 1-1). The Port facility includes two harbors: the Pascagoula River Harbor and the Bayou Casotte Harbor. The Pascagoula Harbor is located on the western side of the Port property and leads north into the Pascagoula River. The Bayou Casotte Harbor is located on the eastern side of the Port. Both of these sites are located south of U.S. Highway 90. Mississippi State Highways 619 and 611 provide land access into the Pascagoula River Harbor and the Bayou Casotte Harbor, respectively.

Each of the harbors includes berthing and docking facilities for loading and unloading vessels and vessel repair and construction. The Pascagoula River Harbor Port facilities include: 436,000 square feet of covered storage, cold storage facilities, and open storage adjacent to the berthing and docking areas. The Bayou Casotte Harbor Port facilities provide: approximately 4 acres of paved and 10 acres of unpaved open storage, and two 175,000 square foot transit sheds adjacent to their terminals.

Vessel access to these areas is provided by the Pascagoula Sound Channels (i.e., Lower Sound Channel and the Upper Sound Channel). Ships calling at the Port enter the Mississippi Sound from the Gulf of Mexico via the Horn Island Pass Channel, which passes between Horn Island on the west, and Petit Bois Island on the east. This channel joins the Lower

Sound Channel, which continues northward and splits at the "Y" into the Upper Sound Channel to the west and the Bayou Casotte Channel to the east. The Upper Sound Channel provides vessel access to the Pascagoula River Channel.

1.2 Purpose and Need

Currently, the existing Lower Sound Channel and the Bayou Casotte Channel are both maintained at a depth of -42 feet below mean lower low water (MLLW) and a width of 350 feet. The Project proposes to add an additional 100 feet to the overall width of the existing Lower Sound and the Bayou Casotte Channels to the lower Turning Basin for a total of approximately 7.2 miles. The proposed action would provide vessel traffic in the channel with added travel capacity, as the current travel restrictions (daylight only, one way, wind/current limitations) impose limitations on the vessel type and arrival/departure frequency of the existing fleet calling at the public and private terminals along the Bayou Casotte Channel.

This dredged material management plan (DMMP) supplements the alternatives that will be evaluated as part of the Regulatory EIS. The DMMP will provide assessments of the dredging and placement methods appropriate for the new work dredging associated with the Project.

2 STUDY DESCRIPTION AND LIMITATIONS

The DMMP for the Project provides:

- Description of the site location and Project area.
- Review of previous dredging events at the Port and the Federal Navigation Channel (FNC) segments.
- Available sediment characterization data from samples taken of the proposed new work dredging material.
- Evaluation of the following placement alternatives for dredged material generated by the Project:
  - Upland placement in the existing Bayou Casotte Dredged Material Management Site (DMMS).
  - Upland placement in the existing Triple Barrel DMMS.
  - Planned upland and beneficial use (BU) placement sites at Singing River Island.
  - Proposed BU site at Round Island.
  - Pascagoula Offshore Dredged Material Disposal Site (ODMDS).
  - BU placement in the Littoral Zone Area (LZA).
- Review of available information for dredging options associated with the new work dredging for the Project.
- Review of available information associated with the incremental maintenance dredging for the Project.
- BU options for dredged material placement.
- ODMDS description and evaluation.
- Dredging and placement alternatives recommendations.

This DMMP evaluates the Port's 100 foot alternatives for widening the channel.

3 SITE CONDITIONS

Previous investigations (EA 2011a, b) have characterized the sediments from the Project. Relevant data for the proposed new work dredging material are discussed below. The sample locations along the channels are shown in Figures 3-1 and 3-2.

3.1 Sediment Physical Characteristics

As part of the bulk sediment testing performed for the sediment characterization (EA 2011b), the physical characteristics (i.e., grain size, specific gravity, and percent solids) were analyzed. An evaluation of the material type is necessary to evaluate potential placement options (e.g., BU or ODMDS). Table 3-1 provides the complete set of bulk sediment physical characteristic data gathered for the evaluation of the new work materials.

The sediment analyzed from along the Bayou Casotte Channel exhibit high silt and clay fraction (ranges from 70.2 to 97.5 percent). A greater variation is seen in the sediments sampled along the Lower Sound Channel, as the two samples near Horn Island exhibit a sand fraction that is greater than the other sample locations (85 to 91 percent). In general, the geotechnical analyses indicate that the majority of the proposed new work material is silt and clay, with increasing amounts of sand closer to the barrier island chain.

In addition, the USACE (2011b) have provided an assessment of the littoral sand transported into the Lower Sound Channel. Littoral sand is defined by the USACE to be material with a sand fraction greater than 70 percent. Borings from two station location intervals along this channel segment encountered sands classified as SP (poorly graded clean sand) and SM (silty sand). The analysis estimated the quantity of littoral sand that would be dredged as part of the new work for each channel widening alternatives. These values are discussed as part of the alternative evaluations in Sections 4.3.2.2 and 4.3.2.3.

3.2 Environmental Sampling

The following sections discuss the recent sediment characterization sampling performed for the Project (EA 2011a, b). The sediment results are presented according to the evaluation tiers established by the U.S. Environmental Protection Agency (USEPA) and the USACE (1991). These results are also compared to the screening criteria for potential BU candidate dredged material, using the guidelines and interim protocols developed by the Mississippi Department of Marine Resources (MDMR).

3.2.1 Offshore Dredged Material Disposal Site Requirements

Offshore placement of dredged material is regulated by both the USEPA and the USACE. Section 103 of the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 specifies that material selected for ocean dumping must meet the criteria established by the USEPA in Title 40 of the Code of Federal Regulations (CFR), Parts 220-228, which establish the requisite chemical and physical characteristics of the sediments. Evaluation oversight is provided by the USACE, as they are the permitting agency for the transport of dredged materials, and the sediment evaluations and testing are subject to USEPA review and concurrence.

The USEPA and the USACE have developed a guidance document for sediment evaluation: *Evaluation for Ocean Disposal – Testing Manual* (USEPA/USACE 1991); more commonly known as the "Green Book." The evaluation criteria presented in this document are arranged in four tiers:

- Tier 1 Evaluation of Existing Information
- Tier 2 Conservative Screening Tools
- Tier 3 Laboratory Bioassays
- Tier 4 Advanced Biological Evaluations

This documentation, along with ocean dumping regulations, stresses the use of bioassays for effects-based-testing; these evaluative tools are necessary to determine suitability of dredged material for placement in an ODMDS. Per 40 CFR 227.13(c), evaluation of dredged material focuses on biological effects rather than the concentration of contaminants, and bioassay testing focuses primarily on the impact of the solid phase on the benthic environment. Dredged material deposited on the seafloor usually has greater potential to cause impact to a smaller area for a longer period than the fraction of dredged material released to the water column.

The dredged material evaluation for a proposed project must follow the tiered evaluation process (i.e., Tiers 1, 2, and 3) to determine suitability for ocean dumping. Quantitative comparisons of the effect(s) of a dredged material and acceptable conditions, as represented by reference sediments, indicate whether the dredged material in question causes a direct and specific biological effect under test conditions, which indicates the potential to adversely affect the biological receptors at the ODMDS. If the results of the appropriate tests and evaluations show that the proposed dredged materials meet the criteria under 40 CFR 227, disposal of the material at an USEPA-designated ODMDS is acceptable.

As described in the recent sediment characterization effort (EA 2011b), none of the Tier 1 exclusionary criteria are met. Specifically, based on physical and chemical sediment testing conducted in 2010 (EA 2011a), it was found that the existing sediments in the new work dredging area contain a high silt and clay fraction. Due to the difference from the ODMDS substrate, the sediment characterization provides an evaluation of the new work materials associated with the Project, based on the requirements of Tier 2 (bulk sediment and standard elutriate testing) and Tier 3 (water column and whole sediment bioassay testing and bioaccumulation studies). The following sections briefly describe the results of the testing performed for the Tier 2 and Tier 3 evaluations (EA 2011a, b); the referenced original documentation contains the complete listing of analytes and their resultant concentrations.

3.2.1.1 Tier 2 Evaluation

The Tier 2 evaluation requires that the proposed new work dredged material be analyzed for bulk sediment properties and standard elutriate testing. The physical sediment properties analyzed as part of the bulk sediment testing are presented in Section 3.1. Sediment chemistry testing results for metals, polycyclic aromatic hydrocarbons (PAHs), semivolatile organic compounds (SVOCs), polychlorinated biphenyl (PCB) congeners, and chlorinated pesticides, were compared to sediment quality guidelines (SQGs) established by MacDonald et al. (1996) and the Canadian Council of Ministers of the Environment (2001). A summary of the testing results is presented in Table 3-2. Several analytes tested exceeded the established threshold effects level (TEL); however, none of the concentrations exceeded the probable effects level (PEL). Additionally, general chemistry analytes, dioxin and furan congeners[1], and butyltins[2] were tested in the sediment samples.

In order to evaluate the limiting permissible concentration (LPC) compliance of the new work dredged material for placement at the Pascagoula ODMDS, site water and standard elutriate evaluations were performed for the target analytes to assess exceedances, as compared to the USEPA's water quality criteria (WQC) for saltwater for aquatic life. The WQC are two values, acute and chronic, which define two exceedance thresholds for the tested analytes.

Site water was collected from two locations along the channel and standard elutriate testing was performed for sediments collected at each of the sampling locations (Figure 3-1). No exceedances were detected in the site water samples analyzed as part of this evaluation. Table 3-3 presents a summary of the results of the standard elutriate testing performed for the dredged material evaluation (EA 2011a). It should be noted that while testing was performed for PAHs, PCBs, and dioxin and furan congeners, there are no USEPA saltwater chronic or acute criteria for aquatic life for these analytes.

Based on the evaluation of all the analytes, it was determined that ammonia was the most prevalent and had the highest probability to exist in the sediments placed at the Pascagoula ODMDS. In order to comply with the LPC, a specified dilution of a particular analyte must be achieved, such that concentrations are below the chronic WQC within 4 hours after placement. The highest ammonia elutriate concentration in the Bayou Casotte Channel (25.2 mg/L) was detected in the BCW-01 sample location. The chronic WQC for ammonia in the Bayou Casotte Channel was calculated to be 0.875 mg/L. The dilution required to meet LPC compliance is the quotient of the elutriate concentration and the chronic WQC, which in this case is calculated to be 28.8; therefore, a maximum dilution of 29-fold is required for ammonia concentrations to meet the LPC (EA 2011b).

A similar approach was taken for the LPC evaluation of the sediments from the Lower Sound Channel. The highest ammonia elutriate concentration (20.5 mg/L) was detected in the PLS-

[1] There are no SQGs for general chemistry analytes and dioxin and furan congeners.
[2] None of the samples that were tested contained butyltins.

01/02 composite sample. The chronic WQC for ammonia in the Lower Sound Channel was calculated to be 0.553 mg/L. The dilution required to meet LPC compliance is the quotient of the elutriate concentration and the chronic WQC, which in this case is calculated to be 37.1; therefore, a maximum dilution of 38-fold is required for ammonia concentrations to meet the LPC (EA 2011b).

The required dilutions were compared to the results of the Short-Term FATE (STFATE) modeling performed for the proposed material placement at the Pascagoula ODMDS. The results are discussed in Section 6.

3.2.1.2 Tier 3 Evaluation

The Tier 3 evaluation reviews the water column bioassay; whole sediment bioassay; and bioaccumulation tests for the samples collected at the proposed new work dredging site. As with the standard elutriate tests, the LPC and the corresponding dilution factors are used to evaluate the suitability of the dredged materials for offshore placement. For water column testing, the USEPA/USACE (1991) uses the median effective concentration (EC_{50}) and the median lethal concentration (LC_{50}) as thresholds for the evaluation; specifically, the LPC for ODMDS placement is equivalent to 0.01 of the EC_{50}/LC_{50} within a 4 hour dilution period after placement. In the case of whole sediment bioassays, if the sediments cause mortality that: 1) is statistically greater than the reference sediment, and 2) exceeds the reference sediment mortality by at least 10 percent (amphipod tests are allowed 20 percent mortality), then the proposed dredged material does not comply with the established LPC (USEPA/USACE 1991).

Three test species were utilized for the water column bioassay testing: 1) *Mytilus edulis* (blue mussel); 2) *Americamysis bahia* (inland silverside); and 3) *Menidia beryllina* (opossum shrimp). The blue mussel testing assessed the effects on embryonic development (48 hour EC_{50}) and the latter two species were analyzed for organism survival (96 hour LC_{50}).

Eight of the nine water column bioassay tests for blue mussel exhibited survival that was statistically significant from the control. The minimum EC_{50} in the Bayou Casotte Channel was calculated to be 57.9 percent of the elutriate concentration; this value corresponds to sample BCW-02. In order to achieve a 4 hour post-placement concentration equal to 0.01 of the EC_{50}, a dilution of 173-fold is required. The minimum EC_{50} in the Lower Sound Channel was calculated to be 62.5 percent of the elutriate concentration; this value corresponds to sample PLS-01/02. In order to achieve a 4 hour post-placement concentration equal to 0.01 of the EC_{50}, a dilution of 160-fold is required.

For the remaining 96 hour water column bioassay tests, it was found that the LC_{50} in all instances was greater than 100 percent of the elutriate concentration; therefore, for those samples exhibiting mortality that was statistically significant from the control, the dilution required is 100-fold.

Whole sediment bioassay testing was performed for two organisms: 1) *Neanthes arenaceodentata* (polychaete), and 2) *Leptocheirus plumulosus* (estuarine amphipod). None of the sediments tested exhibited a 10 day mean survival percentage that was statistically different from the reference sediments.

Bioaccumulation testing was performed for two organisms: 1) *Nereis virens* (sand worm) and, 2) *Macoma nasuta* (blunt-nose clam). Survival was assessed for each organism when exposed for 28 days to reference sediments, a laboratory control, and the sediments from each sample site. Neither organism displayed a 28 day mean survival percentage that was statistically different from the reference sediment. Mean tissue concentrations for each organism were compared to two sources:

- U.S. Food and Drug Administration (USFDA) action levels
- USEPA - Region 4 background tissue concentrations

Based on the testing results, tissue concentrations for three metals (arsenic, copper, and lead) and the dioxin toxicity equivalency quotient (TEQ)[3] were compared to the USFDA action levels and the USEPA background concentrations. None of the analytes tested surpassed the

[3] Specifically, octachlorodibenzo-p-dioxin (OCDD) was detected in samples BCW-05 (worms and clams), BCW-06 (clams), and PLS-01/02 (worms and clams), and 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin (HpCDD) was detected in PLS-01/02 (clams). Only four instances occurred where a test organism's tissue was significantly different than both the reference and pre-test tissue concentrations of OCDD, which is the least toxic of the dioxin congeners.

established USFDA action levels. Tissue sample concentrations of lead (clams) and dioxin TEQ (worms and clams) did exceeded the USEPA background concentrations (PLS-03/04 and BCW-06). The lead tissue concentration of PLS-03/04 was also statistically different from the concentration found in tissue gathered from organisms exposed to the reference sediments. Concurrence by the USEPA regarding this exceedance is required prior to dredge material placement to determine whether the LPC is in compliance (EA 2011b).

With regard to the dioxin TEQ exceedances, the tissue concentrations of organisms exposed to the reference site sediments also exceeded the USEPA background concentration criteria. Additionally, none of the dioxin TEQ values for the tissues gathered from organisms exposed to the sample sediments exceeded both the pre-test and reference site concentrations; therefore, based on the assessment of the TEQ values and the individual tissue sample concentrations, it was assumed that the OCDD was likely not to produce a toxic effect.

3.2.2 Sampling and Analysis Review

Anchor QEA, LLC (Anchor QEA) recently reviewed (2011) the sampling and analysis results presented in the draft *Evaluation of Dredged Material Pascagoula Harbor Federal Navigation Channel Improvements Project*—relevant results are provided in Appendix A. The goal of the review was to provide clarification on the tissue chemistry data results presented therein and are summarized in the preceding section. The following summary is intended to augment the reference to the draft EA (2011b) report in both the Regulatory EIS and Section 103 MPRSA Permit for the Project.

Minor deviations were noted between the Project's bioassay laboratory methods and standard testing requirements, such as: 1) the tests being conducted outside standard temperature ranges, 2) atypical reference toxicant test procedures, and 3) the use of non-standard ammonia concentration reduction procedures. These deviations likely did not alter test findings; however, USEPA must approve and accept these procedural deviations.

The draft *Evaluation of Dredged Material Pascagoula Harbor Federal Navigation Channel Improvements Project* (EA 2011b) compared arsenic, copper, lead, and the dioxin TEQ to USFDA action levels and USEPA background concentrations. None of the analytes surpassed the USFDA action levels; however, lead and dioxin TEQ exceeded the USEPA background concentrations. The USFDA action levels are fairly high values, and consequently, comparison of tissue concentrations to USFDA action levels is not always a compelling argument for ocean disposal. As a result, Anchor QEA compared the mean OCDD, dioxin TEQ, and lead tissue concentrations (those analytes greater than the USEPA background concentrations) to the relevant effects concentrations in the USACE Engineer Research and Development Center (ERDC) Environmental Residue-Effects Database[4] (ERED). The comparison results are summarized in Table 3-4, and indicate that all of the Project materials tested will not result in unacceptable bioaccumulation in the ODMDS and should be acceptable for ocean disposal at the Pascagoula ODMDS.

- OCDD concentrations in clams exposed to BCW-05, BCW-06, and PLS-01/02 sediment and in worms exposed to PLS-01/02 sediment were more than four times lower than the no observable effects dose (NOED) for the most toxic dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]) for the most relevant species within the ERED.
  - 300 nanograms per kilogram (ng/kg) in the *Pacifastacus leniusculus* (freshwater crayfish)
- TEQ concentrations in clams exposed to BCW-05, BCW-06, and PLS-01/02 sediment and in worms exposed to PLS-01/02 sediment were more than nine times lower than the NOED for the most relevant species within the ERED.
  - 300 ng/kg in the freshwater crayfish
- Lead concentrations in clams exposed to PLS-03/04 sediment were more than three times lower than the NOED for the most relevant species within the ERED.
  - 2.28 mg/kg in the *Crassostrea virginica* (eastern oyster)

Sampling for this Project was conducted by EA in April 2010; however, dredging is currently scheduled for late 2014 to early 2015. As a result, the data collected will exceed the three-year acceptability criteria, and re-evaluation of the material may be required prior to dredging. This requirement may be negotiated with the regional USACE and USEPA regulators, as the proposed dredging volume consists of all new work sediments; therefore, the probability and risk of contamination is minimal.

[4] http://el.erdc.usace.army.mil/ered/

3.2.3 Beneficial Use Sediment Screening Criteria

The final *Master Plan for the Beneficial Use of Dredged Material for Coastal Mississippi* (Plan) (CH2M HILL 2011a) provides details for the interim guidance regarding the testing protocols for potential BU material. The purpose of these protocols is to encourage the use of dredged materials at BU sites rather than at upland disposal locations. As stated in the Plan, the specific aims are to:

- *Provide regulators and permit applicants with consistent guidance for evaluating, sampling, and testing sediments to be dredged from waters of the state for potential use in Mississippi's Beneficial Use of Dredge Material Program;*
- *Minimize the burden on applicants and contractors as they seek compliance with Mississippi's Beneficial Use of Dredge Material Law (section 49-27-61, Mississippi Code of 1972) effective July 1, 2010;*
- *Establish nonanalytical evaluation as the baseline for non-commercial/ industrial (low risk) dredging projects;*
- *Delineate when bioassay screening is allowed and when chemical analysis will be required; and*
- *Develop standardized chemical testing/screening methods for projects with higher risk due to association with certain commercial or industrial environments[5].*

These goals are supplemented with specific interim protocols for the evaluation, sampling, and analysis of materials from a proposed dredging Project site; each is described in Table 3-5. The existing sediment characterization data (EA 2011a, b), provides the bioassay results to evaluate the suitability of dredged materials for BU. According to the results of the 10 day whole sediment toxicity testing (bioassay) for estuarine amphipod, none of these samples exhibited a 10 day mean percent survival rate that was statistically different from the reference sediment sample, indicating dredged sediments would be suitable for placement in a State BU site.

[5] At this time, the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables protocols will be required unless more specific potential contaminant information is available and/or more focused or alternate testing methodologies are proposed by the applicant and accepted by the appropriate regulatory agencies (CH2M HILL 2011a).

4 PROPOSED DREDGING AND PLACEMENT ALTERNATIVES

4.1 Methods

A total of nine alternatives for the Project are being reviewed by the USACE Feasibility Study (USACE 2011b), while only two are being evaluated by the Port in the Regulatory EIS. An evaluation of each alternative to fulfill the needs of the Project was used to eliminate seven of the nine alternatives from consideration for the Project. The remaining dredging alternatives are listed below:

- No-Action
- Alternative 1 - widen existing channels on the western side by 100 feet
- Alternative 2 - widen existing channels on either side by 50 feet

4.1.1 New Work Dredged Material Placement Alternatives

Six placement alternatives were identified and evaluated for the dredged materials generated by the Project and are shown on Figure 1-1. The sites vary in type, capacity, and availability. The two upland sites proposed for dredged material placement, the Bayou Casotte and the Triple Barrel DMMSs, have historically been used for maintenance events in the harbor or the landward channel segments. Two BU sites included in the alternatives analysis are Singing River Island and Round Island. Singing River Island is located nearshore along the western bank of the Pascagoula River; the BU site is along the southern portion of the island in open water. Round Island is located south of Singing River Island in the Mississippi Sound. The remaining alternatives are offshore placement locations, the LZA and the ODMDS. The LZA east of Horn Island has been identified as a BU candidate for sandy dredged materials excavated for the Project. The Pascagoula ODMDS, located south of Horn Island, was designated for new work and maintenance dredged materials in 1991 by the USEPA.

4.1.2 New Work Dredging Alternatives

All dredging activities for the proposed Project will primarily focus on the new work materials excavated within the specified Project limits to complete the channel widening. The total dredging quantity for the proposed alternatives ranges from approximately 3.29 to 3.39 million cubic yards (mcy) (USACE 2011b). These quantities have been rounded up to the nearest 5,000 cubic yards (cy). As discussed in Section 3.1, the USACE (2011b) has also estimated the quantity of the new work material expected to contain littoral sands. These values are dependent on the widening alternative, and are discussed in the following sections.

4.2 Analysis of New Work Placement Alternatives

4.2.1 Bayou Casotte DMMS

This site is located on the eastern side of the Bayou Casotte Channel, adjacent to the Gulf LNG facility (Figure 1-1) and is approximately 136 acres (Shiner Moseley and Associates 2005). This DMMS was established by the Port and the USACE in 2004 to contain maintenance materials dredged from the Bayou Casotte Harbor. The Bayou Casotte DMMS is surrounded by containment dikes, which are constructed and maintained using the dredged material as a borrow source.

4.2.1.1 Stability and Maintenance

Continued maintenance and incremental vertical construction of these dikes are necessary to prevent failures during dredged material placement and for future capacity. The DMMS is trenched and drained between uses to consolidate and dry the dredged materials as a borrow source and to optimize long term capacity.

4.2.1.2 Capacity

Based on a USACE estimate, the maintenance dredging quantity on a 3 year recurring cycle for the Bayou Casotte DMMS is approximately 580,200 cy, which is only 17 percent of the proposed quantity for the implementation of the Project (USACE 2011b). Recent dredging for the Gulf LNG terminal basin utilized this DMMS for material placement. The operations plan for the site suggests that vertical lifts be limited to 4 feet or less to support drying and management between events or an event capacity of approximately 1.06 mcy.

4.2.1.3 Recommendation

Based on the estimated placement cycle capacity and planned utilization for ongoing maintenance placement, the new work materials for the Project should not be placed in the Bayou Casotte DMMS. This is not a viable alternative.

4.2.2 Triple Barrel DMMS

The Triple Barrel DMMS is located on the north end of the Pascagoula River Harbor (Figure 1-1). It has been previously utilized for maintenance dredging events along the dock areas at the Port since the mid 1970s. The DMMS is approximately 92 acres and lies between natural wetlands to the west and north and industrial Port facilities to the east and south. As a result, the possibility of expanding the footprint of the current Triple Barrel DMMS to attain greater capacity is not feasible.

4.2.2.1 Stability and Maintenance

The Triple Barrel DMMS is currently undergoing extensive maintenance to the containment dikes and drainage structures. As part of the current restoration and construction, the dike crest height will be raised to approximately 35 feet. These activities will support continued maintenance dredging from the landward segment of the FNC.

4.2.2.2 Capacity

This DMMS has been utilized regularly for the routine maintenance dredging events by the USACE in the FNC, the Port, and private dock owners. Based on USACE Site Management guidelines, the site has an approximate 600,000 cy capacity on a 2.5 to 3 year utilization cycle.

4.2.2.3 Recommendation

Based on the extensive containment dike restoration and the estimated cycle capacity, placing the new work dredging material associated with the Project at the Triple Barrel DMMS is not a viable alternative.

4.2.3 Singing River Island

This site is located at the southern end of the Singing River Island complex, which was previously the Naval Station Pascagoula (Figure 1-1). The proposed BU placement site is approximately 425 acres, which will be contained by geotube structures along the perimeter alignment. The planned purpose of this site is for maintenance materials dredged from the FNC, and public and private docks.

4.2.3.1 Stability and Maintenance

The site has not been constructed; however, the proposed design allows for gaps to be placed in the geotextile tube alignment to promote circulation and fish passage once the site becomes active. Periodic maintenance will be required for water quality and utilization.

4.2.3.2 Capacity

The geotextile tubes are most effective when filled with sandy material. An estimated 200,000 to 400,000 cy of material is required to completely fill the geotextile tubes needed to construct the perimeter containment (Shiner Moseley and Associates 2005). The additional capacity is estimated to be approximately 5.3 mcy for future maintenance of the FNC.

4.2.3.3 Recommendation

The materials dredged for the Project include adequate sand content and quantity to meet the needs of geotextile tube construction and the additional site capacity is being planned and permitted to support the FNC. Without significant impacts to the FNC, this site cannot meet the needs of the Project. Additionally, this site has not been permitted for development or use. Using the proposed BU expansion is not a viable option.

4.2.4 Round Island

Round Island is located approximately 2.5 miles south of Singing River Island (Figure 1-1). The present footprint of the island is 45 acres; however, the historic land mass was approximately 150 acres (CH2M HILL 2011b). The island provides habitat for a variety of birds and is located within the Gulf Sturgeon critical habitat area (CH2M HILL 2011b, Shiner

Moseley and Associates 2005) and a historic lighthouse foundation. Some portions of the island are privately held, with the remainder State-owned.

Based on consultations with the USACE and the City of Pascagoula, the State is considering BU beach nourishment with interspaced marshes. The conceptual placement plan (CH2M HILL 2011b) includes the placement of sandy dredged materials along the southern and western sides of the island protected by wave attenuation structures, with inner marsh cells.

4.2.4.1 Stability and Maintenance

The island sits in open water off the shoreline, and as a result, is affected by wave action caused by daily tides and tropical events. In order to adequately protect the site from further erosion, shoreline protection containment structures are proposed for the southern portion of the site (CH2M HILL 2011b). The structures would be included as a necessary design element alongside the BU activities at the site. However, since portions of the island are privately owned, the material placement is proposed for areas that are adjacent to the existing State owned shoreline and will not impinge on private lands.

4.2.4.2 Capacity

Based on a recent evaluation, approximately 3.3 mcy of dredged material would be required to restore the island to its historic 150 acre footprint and create an additional expanded area to increase the island's area beyond its historic footprint (CH2M HILL 2011b). The material placed for the restoration and expansion effort could consist of clays or other material types for initial lifts; finished cover layers will be sandy material (CH2M HILL 2011b).

4.2.4.3 Recommendation

The permitting requirements for the BU site and the necessary cost of construction for the containment structures, specifically the latter, significantly offset this alternative from the rest. The cost for the recommended containment structures is estimated to range from $1.7 to $2.5 million (CH2M HILL 2011b). Since the site has not been permitted and constructed, and the Project material characteristics are predominately clay, this site is not considered a viable option.

4.2.5 Pascagoula ODMDS

The Pascagoula ODMDS was designated in 1991 by the USEPA for both new work and maintenance materials generated by the Pascagoula Harbor Channel area executed by both public and private entities. It is located south of Horn Island, north of the Safety Fairway, and west of the Horn Island Pass Channel (Figure 1-1). It has an area of approximately 24 square nautical miles, with water depths ranging from 38 feet in the northern area to greater than 52 feet in the south (USEPA/USACE 2006).

4.2.5.1 Stability and Maintenance

The offshore hydrodynamic conditions at the site are significant and promote erosion and off-site dispersion of dredged materials placed there. Placement methods, sequencing, and location are necessary prior to the execution of the Project. Coordinating the proposed action with the USACE and other planned events will minimize any potential environmental effects during and after placement. As described in the *Pascagoula Ocean Dredged Material Disposal Site – Site Management and Monitoring Plan,* regular monitoring efforts to assess the site conditions will determine the need to modify future dredging and placement practices (USEPA/USACE 2006).

4.2.5.2 Capacity

The “dispersiveness” of the site and the associated capacity has not been determined (USEPA/USACE 2006). The estimated maintenance quantities proposed for placement at the site range from 3 mcy to 8 mcy for a 10 year period (USEPA/USACE 2006). Pre and Post-placement surveys of previous placement events within the ODMDS are collected by the USACE to verify that the capacity within any sub-area of the site has not exceeded the established limitations.

The proposed Project is permitted under Section 103 (MPRSA) ocean disposal permits and is therefore conditioned, as necessary, to assure consistency with the SMMP (USEPA/USACE 2006). SMMP provisions comprise the requirements for all dredged material disposal activities at the site. The estimated volume of sediments to be placed at the ODMDS under the preferred alternative is 2.4 mcy, which is below the 10 mcy threshold identified in the SMMP for evaluation of dispersive nature and long and short term capacity of new work volumes. However, conservative estimates have been developed based on data available from the SMMP:

- Estimated dredged material volumes placed at the ODMDS through 2010 range from 50 to 80 mcy and projected estimates for the 10 years following 2006 (i.e. through 2016) are 3 to 8 mcy.
- Dredged material is placed in a designated portion of the ODMDS site until the depth limitations are reached before beginning placement in another designated portion of the ODMDS.

Therefore, a conservative estimate of remaining capacity of the ODMDS can be calculated based on the areal extent of the ODMDS site that has not been designated for use. Using the coordinates of the designated ODMDS (SMMP 2006) and the designated portions in use for sediment placement, the remaining areal extent available is 20.3 square nautical miles. Therefore, the Pascagoula ODMDS has ample capacity to accommodate the proposed Project (refer to map in SMMP).

Should the results of the monitoring surveys or valid reports from other sources indicate that continued use of the ODMDS would lead to unacceptable effects, the ODMDS management will be modified to mitigate the adverse effects, per the SMMP, which will be reviewed and updated at least every 10 years.

4.2.5.3 Recommendation

This site is a viable location for dredged material placement. It has been designated by the USEPA and requires no further permitting. Previous new work and maintenance dredging events in the Port vicinity have utilized this site, and there are no documented capacity concerns.

4.2.6 Littoral Zone Placement

The LZA is an open water placement site located southeast of Horn Island and to the west of the existing Safety Fairway and the Horn Island Pass. The LZA is a southern portion of the Site 10 open water placement area designated by the USACE during implementation of the 1970 Clean Water Act. The site is identified and discussed in the Special Management Plan

(RMF 1985) for the Port. Subsequent EISs for the continued maintenance show the LZA and Site 10 as two separate sites (CH2M HILL 2010), with the LZA designated to receive sand from maintenance dredging of the Horn Island Pass channel through the barrier islands. Use has been more prevalent in the deeper areas to minimize impacts to the island shoreline, migratory birds, turtle nesting, and marine safety for the hopper and pipeline dredges.

In general, the northeastern portion of the LZA is the shallowest region of the site, and the southwestern region is the deepest. Previous maintenance dredging events in the area have utilized the LZA for sandy material placement. The intent of this site is to keep the sandier sediments in the natural littoral drift along the barrier island coast. The only materials suitable for placement in this site are sands.

4.2.6.1 Stability and Maintenance

The intent of material placement in this site is for the natural east-to-west littoral drift to transport sandy material in the direction of the barrier islands and other nearshore areas. The natural nearshore hydrodynamics in the region will gradually move the mounds of dredged material placed within the site. This site does not require maintenance; however, pre- and post-placement surveys are necessary to establish the bathymetric conditions on-site.

4.2.6.2 Capacity

A pre-placement survey will be necessary to establish the actual capacity of the LZA; however, based on the available data from the USACE, it is not expected that the estimated Project sand quantity will exceed the site's capacity.

4.2.6.3 Recommendation

This site is a viable location for dredged material placement. It has been permitted for use; however, the material requirement (sands) for this site will only allow for a portion of the estimated dredged quantity to be placed at the site. Previous maintenance dredging events in the Port vicinity have utilized this site for placement, and there are no current documented capacity issues.

4.3 Analysis of New Work Dredging Alternatives

4.3.1 Proposed Action

Dredging for the proposed channel widening will only consider the two alternatives for incrementally widening the channel 100 feet and the bend easing at the transition with the Horn Island Pass Channel:

- Alternative 1 – Widen the channel 100 feet to the west
- Alternative 2 – Widen the channel 50 feet to the west and 50 feet to the east

The channel alternatives share the same or similar characteristics listed below:

- Approximately 7.2 miles of the Lower Sound and the Bayou Casotte Channels
- Dredge within the specified existing channel depth, side slopes, advanced maintenance, and allowable overdepth
    - Project depth: -42 feet MLLW
        - 2 feet of advance maintenance
        - Side slopes originating at -44 feet MLLW and consistent with the FNC
        - Allowable overdepth (tolerance): 2 feet
        - Bend easing at the Horn Island Pass Channel intercept proportional with the increment widened to the west

The Alternatives for placing the dredged material have been narrowed to the following:

- Transport and satisfactorily place silt and clay new work material within the specified placement site boundaries of the USEPA-designated Pascagoula ODMDS
- Transport and satisfactorily place new work sands within the LZA

4.3.2 Alternatives Analysis

4.3.2.1 No-Action

The No-Action alternative does not prescribe any dredging activities to widen the existing Lower Sound Channel or the Bayou Casotte Channel, and there are no costs associated with this alternative. In the No-Action alternative, the USACE will continue to maintain the current FNC. The current dimensions for both channels (-42 feet [MLLW] deep and 350 feet wide) would not be altered. This alternative provides no additional benefit to the vessel traffic accessing the Bayou Casotte Channel; all current channel restrictions and limitations discussed in Section 1.2 would still be in effect.

With the current channel conditions, increased vessel traffic associated with the Gulf LNG Energy facility would have an effect on other vessels accessing the marine facilities in Bayou Casotte Harbor area. Increased coordination with the Port's Harbormaster may be necessary to prevent excessive access delays.

4.3.2.2 Alternative 1 – Channel Widening Along Western Side

This alternative proposes to widen the existing Lower Sound Channel and the Bayou Casotte Channel by excavating a 100 foot wide area on the western side of both channels. The total length of the dredging area is approximately 7.2 miles from the northern Project limit of the Bayou Casotte Channel to the southern Project limit at the transition between the Lower Sound Channel and the Horn Island Pass. Dredging along the entire channel length would be executed to the Project depth (-42 feet MLLW plus 2 feet of advanced maintenance). An allowable overdepth of 2 feet will be used for the proposed dredging activities and is included in the dredging volume.

The total dredging quantity for this alternative is estimated to be 3.39 mcy (USACE 2011b). As discussed above, a portion of this quantity has been identified to contained littoral sands. According to the USACE (2011b), approximately 125,000 cy consists of the SP and SM sands described in Section 3.1. This portion of the dredged material can be utilized for BU at the LZA adjacent to Horn Island. The remaining 3.26 mcy is estimated to be silt and clay and would be transported and placed at the Pascagoula ODMDS.

Dredging activities for this alternative would be performed via one of the three options described: hopper, mechanical, or hydraulic cutterhead dredge. The length of pipeline required for the hydraulic cutterhead dredging may preclude this method from for some portion of the work.

Placement methods are dependent on the dredging method chosen. Hopper dredges are self-propelled and capable of storing, transporting, and placing the dredged material at a given location. Mechanical dredges would excavate the sediments via bucket (e.g., clamshell) and place them into split-hull or bottom dump barges which would then be transported to the placement site, emptied, and returned to the dredging site for reloading. Hydraulic cutterhead dredges transport and discharge the excavated sediment slurry through a pipeline to the intended placement location. Typically the pipeline length and sea conditions are limiting factors for this type of dredging. A maximum distance of 2 miles can be achieved under normal conditions; however, the distance can be increased to 8 miles using booster pumps (Shiner Moseley and Associates 2005). The discharge pipe termination point can be controlled via a spill barge, which adjusts and tracks the placement location during dredging.

Further evaluation of the effects of the proposed dredging method(s) will be presented in the Project Regulatory EIS. Final determination on the dredging method will be dependent on any anticipated environmental effects cited by the Project Regulatory EIS.

4.3.2.3 Alternative 2 – Channel Widening Along Western and Eastern Sides

This alternative proposes to widen the existing Lower Sound Channel and the Bayou Casotte Channel by excavating a 50 foot wide area on the western and eastern sides of both channels. The total length of the dredging area is approximately 7.2 miles from the northern Project limit at the south turning basin of the Bayou Casotte Channel to the southern Project limit at the transition between the Lower Sound and the Horn Island Pass Channel segments. Dredging along the entire channel length would be executed to the Project depth (-42 feet MLLW plus 2 feet of advanced maintenance). An allowable overdepth of 2 feet will be used for the proposed dredging activities and is included in the estimated dredge volume.

The total dredging quantity for this alternative is estimated to be 3.29 mcy (USACE 2011b). As discussed above, a portion of this quantity has been identified to contained littoral sands. According to the USACE (2011b), approximately 315,000 cy consists of the SP and SM sands described in Section 3.1. This portion of the dredged material can be utilized for BU at the LZA adjacent to Horn Island. The remaining 2.98 mcy is estimated to be silt and clay, and would be transported and placed at the Pascagoula ODMDS.

Dredging activities and placement options for this alternative are identical to those presented in Section 4.3.2.2 for Alternative 1.

Further evaluation of the effects of the proposed dredging method(s) will be presented in the Project Regulatory EIS. Final determination on the dredging method will be dependent on any anticipated environmental effects cited by the Project Regulatory EIS.

4.3.3 Cost Assessment

The cost assessment for the alternatives evaluated utilizes the data developed by the USACE Planning Division. These values represent the most up-to-date information regarding the total estimated Project cost for ODMDS and LZA placement; however, these are planning-level estimates, which are being developed in greater detail following final design (USACE 2011b). The Project alternatives costs include any ancillary cost for the relocation and replacement of navigational aids along the dredging area. Table 4-1 presents the applicable costs developed for the alternatives discussed in Section 4.3.2.

4.3.4 Summary

As shown in Table 4-1, the dredging cost difference between the two widening alternatives is minimal. Specifically, the unit cost delta between the two options is approximately $0.97 per cy, which is a 13 percent reduction from the higher of the two unit costs—Alternative 1 has a total Project cost of $24.6 million. Dredging cost, therefore, is not a limiting factor for either of the presented widening alternatives. The significant cost difference is attributed to moving the navigation aids to reflect the revised westerly centerline.

As with the estimated alternative costs, the environmental benefit (i.e., quantity of material placed for BU) resulting from both alternatives is similar, and as a result, is not a limiting factor. The difference between the BU quantities for Alternatives 1 and 2 is 190,000 cy, which represents approximately 6 percent of the dredged material volume.

Depending on the actual channel traffic during construction, sequencing may be necessary to efficiently execute Alternative 2, as the dredges may need to travel the length of the Project area more than once to excavate on both sides of the channel. Further development of the cost estimates may provide a distinction between the efficiencies associated with both alternatives.

The environmental impacts of each dredging and placement method will be considered as part of the Regulatory EIS, including critical habitat for endangered species.

4.4 Maintenance Dredging and Placement Alternatives

The widening construction of these channel elements is contingent upon the USACE authorization of maintenance for the channel widening. The USACE (2011b) provides the estimates for maintenance quantities expected for the two alternatives evaluated herein, and as a result, maintenance dredging is not discussed further in this document.

5 BENEFICIAL USE

The use of dredged material for marsh creation, beach nourishment, or other environmental enhancement activities is encouraged by the USEPA and USACE. Sediment quality and composition must be evaluated for habitat suitability prior to dredging activities. Additionally, the feasibility, constructability, availability, and cost of the proposed BU site must be considered prior to selection. Several BU locations are presented and have been identified as potential BU sites that could receive the materials dredged as part of the Project; however, the screening process has eliminated all but the LZA southeast of Horn Island. Based on the lack of permitting, the other options for BU have been excluded from further evaluation in the Project EIS.

5.1 Mississippi Law

The goal of BU for coastal Mississippi is to retain sediments "in the system" ensuring that dredged material that comes out of the Mississippi Sound is reused within the system (CH2M HILL 2011a). To facilitate keeping the sediments in the system, Mississippi passed Section 61 of Title 49 Chapter 27, a BU of dredge material law in July 2010. This law requires dredging activities generating over 2,500 cy participate in appropriate BU programs, provided the material is suitable and a BU site is available.

5.2 Site Retained for Further Evaluation: Littoral Zone Placement

The LZA proposed to receive dredged sand material excavated as a result of the Project is displayed on Figure 1-1. Based on a USACE survey from 2007[6], the sediment bottom surface elevation in this site ranges from -7.2 feet MLLW to -30.3 feet MLLW. In general, the northeastern portion of the LZA is the shallowest region of the placement site, and the southwestern is the deepest. The notes on this survey indicate that dredged material placement in the LZA is only permitted in areas of the site where the sediment bottom is between -14 feet MLLW and -22 feet MLLW.

Placing the coarse dredged material (sands in this case) in the LZA directly affects beach accretion. The sediments will be transported by the tidal currents to the nearshore areas of

[6] USACE Survey: http://navigation.sam.usace.army.mil/surveys/index.asp

Horn Island and replenish sediment loss in areas along the shoreline. Additional concerns for placement at the LZA are endangered species habitat. Coordination with the appropriate State and Federal agencies (MDMR and National Marine Fisheries Service [NMFS]) will be necessary to evaluate placement location(s) within the LZA. The portion of the LZA may continue to be affected by a critical habitat designation for the Gulf sturgeon, within one mile of Horn Island. As shown on the Figure 1-1, a majority of the LZA is located within the National Park Service (NPS) Gulf Islands National Seashore boundary. The Port of Pascagoula is coordinating with and applying for a Special Use Permit with NPS to place materials within their park boundary.

6 OFFSHORE PLACEMENT

The USACE makes use of an approved ocean disposal site (i.e., ODMDS) when other open water, BU, or upland disposal options for dredged material are not feasible. Currently, the Pascagoula ODMDS is the only site designated for use in the vicinity of the Project. As part of the ongoing dredged material placement and monitoring at the site, and in order to comply with the Water Resources and Development Act (WRDA) of 1992, the USEPA and USACE (USEPA/USACE 2006) revised the original Site Management and Monitoring Plan (SMMP) for the Pascagoula ODMDS that was submitted as part of the Final EIS developed for site designation. The 2006 SMMP was consulted for the development of the following sections.

6.1 Site Retained for Further Evaluation: Pascagoula ODMDS

The Pascagoula ODMDS is located south of Horn Island, north of the Safety Fairway, and west of the Horn Island Pass Channel (Figure 1-1). It has an area of approximately 24 square nautical miles, and water depths at this site range from 38 feet in the northern area to greater than 52 feet in the southern area (USEPA/USACE 2006). The tide and flow conditions at the Pascagoula ODMDS are substantial enough to cause erosion and off-site dispersion of the placed material; therefore, it is recommended that the placement location(s) and method(s) be determined prior to Project execution to mitigate any adverse effects. The following section reviews the STFATE modeling study conducted by EA (2011b) for the dredged materials associated with the Project. The "dispersiveness" of the site and the associated capacity has not been determined; however, the anticipated dredging quantities (discussed below) presented in the SMMP are not expected to exceed the site's limit.

In general, the ODMDS sediment distribution appears to have the finer material located in the center and south regions of the site and coarse material in the northern region; therefore, sediment placement activities should follow this pattern (USEPA/USACE 2006).

Additionally, in compliance with 40 CFR 227.28, placement shall occur within the ODMDS at a distance greater than 330 feet from the established site boundaries, and placement shall not create depths less than 25 feet. The placement area within the ODMDS for the Project is displayed in Figure 1-1.

This site was established for both new work and maintenance materials generated by dredging for Projects in the Pascagoula Harbor Channel area executed by public and private entities. The SMMP anticipated a total long-term dredge quantity range of 3 mcy to 8 mcy for the 10 year period following 2006. The capacity of the site is not expected to preclude the placement of these materials; however, should the anticipated dredging volumes increase by greater than 25 percent, then an evaluation of the site's capacity may be necessary (USEPA/USACE 2006). Short-term dredging projections for the 5 year period following 2006 are also provided in the SMMP. It was anticipated that the dredging events would occur on even years (2006, 2008, and 2010) and have a capacity of 1 mcy per event; however, this value includes the dredging needs of the Naval Station Pascagoula, which closed in late 2006, after the SMMP had been completed. An outline of the available information regarding the dredged material placement since 1992 is provided in Table 6-1. Information for the years following 2006 was obtained from the USACE-Mobile District dredging history card files and is referenced in the table.

6.1.1 STFATE Modeling

Understanding the effects of dredged material placement prior to Project implementation is essential factor to mitigate adverse impacts to the surrounding environment. The USACE ERDC Environmental Lab (ERDC-EL) has developed a model (STFATE) that simulates the dynamics of dredged material during placement at an open water site. This program, along with its supporting documentation, is publically-available through the ERDC-EL website[7]. Additionally, the USEPA/USACE *Southeast Regional Implementation Manual* (SERIM) provides STFATE model guidance and standard input parameters for engineers and planners evaluating ocean placement in the Atlantic and Gulf Coast waters (USEPA/USACE 2008).

Table 6-2 presents the results from the STFATE Tier 2 and Tier 3 evaluations and the following sections provide a brief overview of the modeling study, and the detailed parameter sets for each STFATE simulation are included in Appendix I of the MPRSA Section 103 Evaluation report (EA 2011b).

[7] http://el.erdc.usace.army.mil/

6.1.1.1 Tier 2 Evaluation (EA 2011b)

In order to comply with the LPC, dilution factors of specific analytes are calculated and compared to the resulting dilution calculated by STFATE. Specifically, based on the results of the standard elutriate tests performed for the Tier 2 evaluation, ammonia was identified to be the constituent most likely to be released in the surrounding environment. Ammonia concentrations in both the Bayou Casotte Channel and the Lower Sound Channel exceeded the chronic WQC (0.875 mg/L and 0.553 mg/L, respectively). LPC compliance for ammonia would be met if dilution factors of 29-fold and 38-fold (the Bayou Casotte Channel and the Lower Sound Channel, respectively) occurred 4 hours after the dredged material was placed at the Pascagoula ODMDS.

Multiple hopper size scenarios were evaluated (Table 6-2); however, based on the results, none of the placement quantities from either channel caused a violation of the LPC for the Tier 2 evaluation. Based on the evaluation, it was determined that elutriates from both channels did not violate the WQC, and new work dredge materials are suitable for placement at the Pascagoula ODMDS.

6.1.1.2 Tier 3 Evaluation (EA 2011b)

In order to comply with the LPC, dilution factors based on 0.01 of the EC_{50}/LC_{50} are calculated and compared to the resulting dilution calculated by STFATE. Specifically, based on the results of the water column bioassays performed for the Tier 3 evaluation, the blue mussel was identified to be the most sensitive of the three organisms tested.

Multiple hopper size scenarios were evaluated (Table 6-2), and based on the results, the two maximum placement quantities from both channels caused a violation of the LPC for the Tier 3 evaluation. Based on the evaluation, it was determined that elutriates from both channels do not violate the water column concentration LPC, and new work dredge materials are suitable for placement at the Pascagoula ODMDS.

7 RECOMMENDATIONS

The goal of this DMMP was to evaluate and present available information pertaining to the Project and present viable alternatives for the new work and maintenance dredging associated with the Project.

Alternatives presented for the new work dredging include:

- No-Action
- Extension of current western channel boundary by 100 feet
- Extension of current eastern and western channel boundaries by 50 feet

From the analysis of the proposed new work dredging alternatives, the differences between overall cost and environmental benefit are negligible; therefore, on this basis, neither alternative could be recommended as a preferred alternative. However, based on the proposed dredge cut locations and input from the navigating professionals using the channel on a daily basis, Alternative 1 will be recommended as the preferred alternative for the new work dredging. The new work dredged materials will be placed in the ODMDS and the LZA. Channel sediments that have greater than 70 percent sand content will be placed in the LZA, after the Special Use Permit has been approved by the NPS.

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TABLES

Table 3-1

Sediment Physical Characteristics[1]

Location	Sample ID	Grain Size (%)				Specific Gravity	Percent Solids
		Sand	Silt	Clay	Silt+Clay		
Bayou Casotte Channel	BCW-01	28.4	45	26.7	71.7	2.69	48.8
	BCW-02	2.5	46.5	51	97.5	2.7	33.2
	BCW-03	29.8	37.1	33.1	70.2	2.71	44.2
	BCW-04	16.8	54.6	28.6	83.2	2.7	39.3
	BCW-05	5	44.7	50.3	95	2.71	32.5
	BCW-06	6.7	46.5	46.8	93.3	2.71	36.2
Lower Sound Channel	PLS-01	14.6	48.1	37.3	85.4	--	--
	PLS-02	7.8	62.6	29.6	92.2	--	--
	PLS-01/02	12.8	52	35.2	87.2	2.7	64.9
	PLS-03	19.6	39.4	41	80.4	--	--
	PLS-04	34.5	23.3	42.2	65.5	--	--
	PLS-03/04	20.5	42.2	37.3	79.5	2.71	46
	PLS-05[2]	91.3	3.5	5.2	8.7	--	--
	PLS-06[2]	87.7	3.5	8.9	12.4	--	--
	PLS-05/06[2]	85.1	4.4	10.6	15	2.68	76.6
Reference Site	Site B	12	53	35.1	88.1	2.7	48.5
	Site D	74.8	17.3	7.8	25.1	2.66	74.6

Notes:

1. This table is populated with data from the EA (2011a) sediment evaluation report.
2. Samples are compared to Reference Site D.

Table 3-2
Sediment Chemistry Summary Table

Analyte	Sample Location	
	Bayou Casotte	**Lower Sound**
Metals[1]	Five samples exceeded TEL by factors of 1.1 to 1.5	One sample exceeded TEL by a factor of 1.4
PAH	Below the TEL	Below the TEL
PCB Congeners	Below the TEL	Below the TEL
Chlorinated Pesticides	Below the TEL	Below the TEL
Dioxin and Furan Congeners[2]	TEQ range from 0.662 ng/kg to 22.1 ng/kg	TEQ range from 3.37 ng/kg to 30.1 ng/kg
SVOC[3]	One sample exceeded TEL by a factor of 2.4	Below the TEL
Butyltins	Not Detected	Not Detected

Notes:

1. Metal detected above TEL was arsenic.
2. Toxicity Equivalency Quotient (TEQ).
3. SVOC detected above TEL was bis(2-ethylhexyl) phthalate.

Table 3-3
Standard Elutriate Sample Summary Table

Analyte	Sample Location	
	Bayou Casotte	**Lower Sound**
General Chemistry[1,2]	All 6 samples exceeded acute criterion	1 sample exceeded the chronic criterion 2 samples exceeded the acute criterion
Metals[3]	1 sample exceeded the chronic criterion 2 samples exceeded the acute criterion	1 sample exceeded acute criterion
Chlorinated Pesticides[4]	3 samples exceeded the chronic criterion	No exceedances detected
SVOC	No exceedances detected	No exceedances detected
Butyltins	No exceedances detected	No exceedances detected

Notes:
1. Criteria exceeded for ammonia (6 instances) and dissolved cyanide (1 instance).
2. Criteria exceeded for ammonia (3 instances).
3. Metal exceedances detected for copper (3 instances) and nickel (1 instance).
4. Chlorinated pesticide exceedances detected for 4,4'-DDT (1 instance), endrin (1 instance), and heptachlor (2 instances).

Table 3-4
Comparison of the Mean OCDD, Dioxin TEQ, and Lead Tissue Concentrations to Relevant Effect Concentrations in the USACE ERDC Environmental Residue-Effects Database

Sample Number	Analyte	Units	RL	Pre-Test Tissue Concentration		Reference Mean Tissue Concentration		Project Area Mean Tissue Concentration		Statistical Significance Relative to Both Pre-Test and Reference*	NOED from ERED	LOED from ERED	Notes on Environmental Residue-Effects Database Values
				Worms	Clams	Worms	Clams	Worms	Clams				
BCW-05	OCDD	ng/kg	10	23.3	ND	16	15.6	28.2	36	clams only	300 ng/kg	3,000 ng/kg	OCDD not found in the ERED; LOED provided is for the most toxic dioxin, 2,3,7,8-TCDD in the freshwater crayfish *Pacifastacus leniusculus* = 3,000 ng/kg; NOED for this species = 300 ng/kg
BCW-06	OCDD	ng/kg	10	23.3	ND	16	15.6	25.2	53	clams only	300 ng/kg	3,000 ng/kg	
PLS-01/02	OCDD	ng/kg	10	23.3	ND	16	15.6	63.8	66.6	worms and clams	300 ng/kg	3,000 ng/kg	
BCW-05	Dioxin TEQ (ND=RL)	ng/kg	NA	7.9	11.4	9.26	11.4	6.63	11.3	none	300 ng/kg	3,000 ng/kg	LOED is for the freshwater crayfish *Pacifastacus leniusculus* = 3,000 ng/kg; NOED for this species = 300 ng/kg
BCW-06	Dioxin TEQ (ND=RL)	ng/kg	NA	7.9	11.4	9.26	11.4	5.34	11.3	none	300 ng/kg	3,000 ng/kg	
PLS-01/02	Dioxin TEQ (ND=RL)	ng/kg	NA	7.9	11.4	9.26	11.4	7.87	31.2	none	300 ng/kg	3,000 ng/kg	
PLS-03/04	Lead	mg/kg	0.1	0.203	0.23	0.11	0.326	0.1	0.746	clams only	2.28 mg/kg	no data	NOED is for the eastern oyster *Crassostrea virginica* = 2.28 mg/kg

* Based on EA Engineering, Science, and Technology (2011a) Report: *Evaluation of Dredged Material Pascagoula Harbor Navigation Channel Improvements Project Pascagoula Jackson County Mississippi*

BCW	Bayou Casotte
ERDC	Engineer Research and Development Center
ERED	Environmental Residue-Effects Database
LOED	lowest observable effect dose
mg/kg	milligram per kilogram
ND	non-detect
ng/kg	nanograms per kilogram
NOED	no observable effect dose
OCDD	octachlorodibenzo-p-dioxin
PLS	Pascagoula Lower Sound
RL	Reporting Limit
TEQ	toxicity equivalent
USACE	U.S. Army Corps of Engineers

Table 3-5

Interim Protocols for Dredge Material Analysis for Beneficial Use[1]

Evaluation[2]	Any information provided by the applicant or their authorized agent regarding the potential for (or the absence of) chemical contamination at the project site or in the immediate vicinity or watershed could be considered to help reduce the need for additional analytical assessment.
	This could include:
	Historical information regarding the use of the project site and/or adjacent or upstream sites.
	Commercially available environmental records searches.
Sampling	Unless an alternative strategy is approved, the minimum sample collection interval will be:
	For dredging projects totaling between 2,500 yd^3 and 25,000 yd^3, a minimum of two grab samples (one pair) will be taken.
	For typical channel dredging or similar “linear” projects, two samples will be from the centerline of the channel, one at the upstream limit and the other at the downstream limit.
	For projects exceeding the base volume of 25,000 yd^3, an additional pair of grab samples will be taken on the centerline for each additional 25,000 yd^3 or part thereof. Each pair of samples will be composited so that each 25,000 yd^3 segment will be individually analyzed. Sample locations for nonlinear projects will be determined on a case by case basis. This sampling methodology may also be adjusted as appropriate on projects greater than 100,000 yd^3. All sample locations will be preapproved by DMR. The specific type of analysis to be run will dictate the sample size, retrieval and handling methods. Please contact the lab that will be used for specific instructions.
Analysis[3]	<u>Sediment Toxicity Tests</u>
	Method for assessing the Toxicity of Sediment-associated Contaminats with Estuarine and Marine Amphipods, Test Method 100.4. EPA/600/R-04/025, June 1994.
	10-day *Leptocheirus plumulosus* sediment toxicity test.
	Includes initial weight data for representative test organisms and final weight data for each replicate of each treatment.
	<u>Analytical Analyses</u>
	Percent organic matter, total organic carbon, and total volatile solids.
	Particle size distribution.
	Sample and shipping containers (ice chests): 1-gallon bucket with lid (HCl and DI Rinsed).

Notes:

1. Reproduced from the final *Master Plan for the Beneficial Use of Dredged Material for Coastal Mississippi* (CH2M HILL 2011a).
2. Applicants or authorized agents may want to approach an initial evaluation of this type as they would a typical Phase 1 Environmental Assessment albeit with a focus on submerged/ aquatic aspects. Where no specific information regarding the potential for contamination (or lack thereof) is provided by the applicant or authorized representative, or if public commentary or other information suggests a possibility of contamination for a noncommercial/nonindustrial project, a nominal bio-assay screening process will be used. If however, specific potential contaminants are identified, chemical analysis will be required.
3. For sites where some specific contaminate data is available or a commercial/ industrial site is involved, NOAA Screening Quick Reference Tables have been accepted by DMR and DEQ on a provisional basis. Additional or alternate chemical analysis may be required based upon site specifics (http://response.restoration.noaa.gov/book_shelf/122_NEW-SQuiRTs.pdf.

Table 4-1

Alternatives Cost Summary[1]

Alternative Characteristic	Unit	Alternative		
		No-Action	**Alternative 1**	**Alternative 2**
Description	--	No Widening	Increase width by 100 feet on the western side of the channel	Increase width by 50 feet on either side of the channel
Channel Dimensions[2]	Depth (ft) Width (ft)	Depth: 42 Width: 350	Depth: 42 Width: 450	Depth: 42 Width: 450
Total Dredge Volume[3]	CY	0	3,390,000	3,290,000
ODMDS Placement Volume[3]	CY	0	3,260,000	2,980,000
LZA Placement Volume3[3]	CY	0	125,000	315,000
Aids to Navigation Relocation Estimated Total Cost[4]	$	0	$3,513,000	$168,000
Project Estimated Total Cost[5]	$	0	$24,600,000	$20,700,000
Estimated Gross Unit Cost[6]	$/CY	0	$7.26	$6.29

Notes:

1. Cost data information for alternatives adapted from USACE (2011b).
2. Depth is referenced to the MLLW datum.
3. Dredging quantity is rounded to the nearest 5,000 cubic yards.
4. Cost is rounded to the nearest $1,000.
5. Cost is rounded to the nearest $100,000.
6. Gross unit cost is calculated as the quotient of the total cost and the estimated dredging quantity.

Table 6-1

Pascagoula ODMDS Dredge Material Placement Volumes[1]

Year	Quantity (CY)	Purpose
1992	168,200	Maintenance
1993	1,161,000	Maintenance
1995	2,650,000	New Work
1998	1,600,000	Maintenance
1999	414,200	Maintenance
2000	7,700,000	New Work
2001	3,495,000	New Work
2002	630,000	Maintenance
2003	1,300,000	Maintenance
2004	1,009,000	Maintenance
2005	121,000	Maintenance
2006	672,495	Maintenance[2]
2007	216,828	Maintenance[2]
2008	1,727,225	Maintenance[2]

Notes:

1. Unless otherwise specified, information in this table was obtained from the USEPA/USACE (2006).
2. Quantity obtained from the USACE dredging history card files.

Table 6-2

STFATE Model Results[1]

Location	Placement Volume (CY)	1 Hour		4 Hour		Water Quality Violation	
		Dilution Factor	Feet Traveled	Dilution Factor	Feet Traveled	Tier 2	Tier 3
Bayou Casotte Channel	4,000	9	224	318	1,914	No	No
	8,000	6	364	186	1,914	No	No
	9,000	6	364	170	1,914	No	Yes
Lower Sound Channel	4,000	11	224	415	1,914	No	No
	8,000	8	364	242	1,914	No	No
	12,000	7	364	179	1,914	No	No
	14,000	6	364	160	2,030	No	No
	15,000	6	430	152	2,030	No	Yes

Notes:

1. STFATE model results from EA (2011b).

FIGURES

NOTES:
1. Aerial imagery copyright, 2010 Microsoft Bing Maps.

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Figure 1-1
Project Location and Placement Sites
Dredged Material Management Plan
Port of Pascagoula – Channel Widening Project

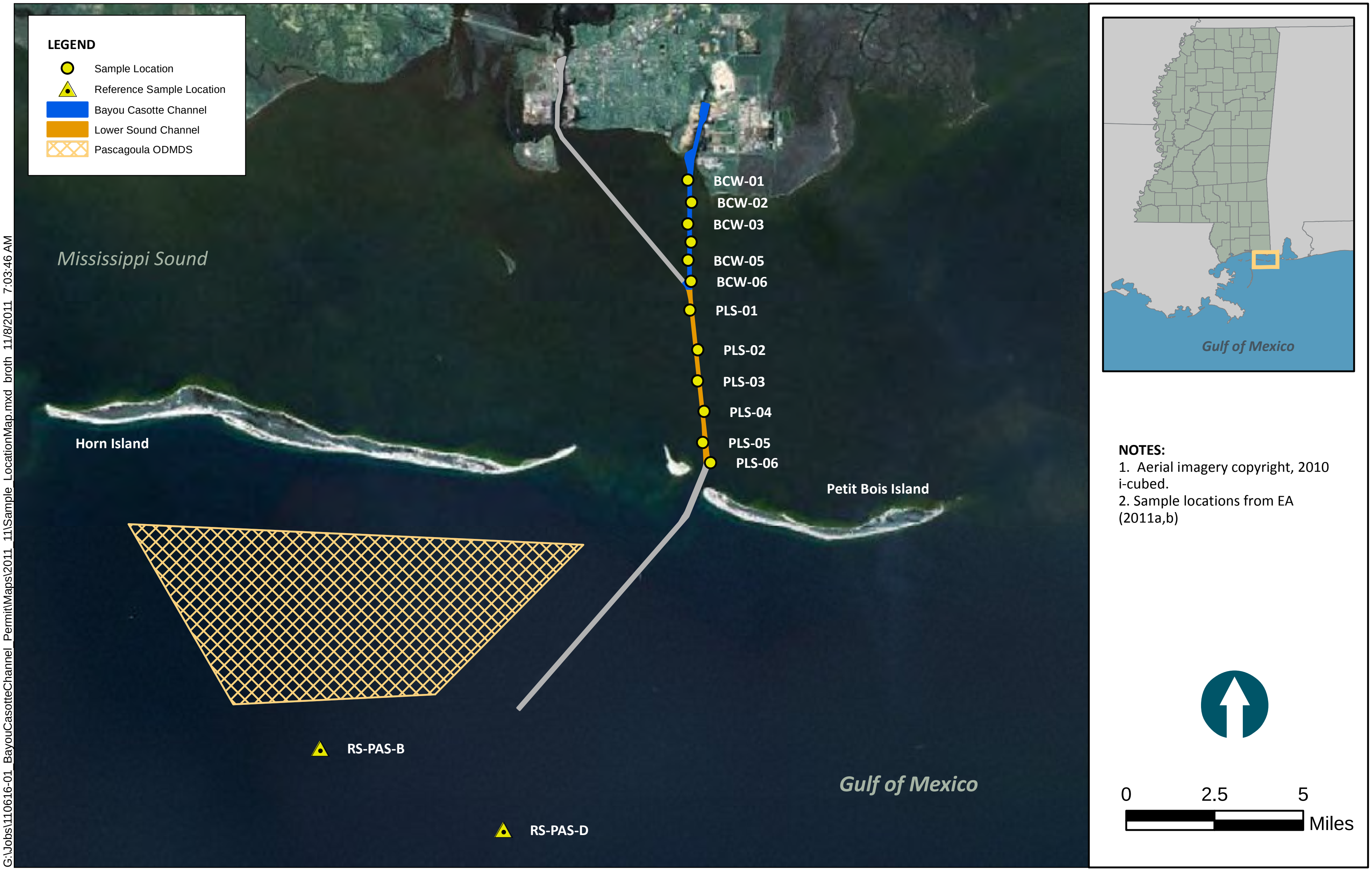

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Figure 3-1
Sample Locations
Dredged Material Management Plan
Port of Pascagoula – Channel Widening Project

NOTES:
1. Aerial imagery copyright, 2010 i-cubed.
2. Sample locations from EA (2011a,b).
3. Two sample locations are available for BCW-01, 02, and 04. The deeper of the two water depths is displayed on the map.

ANCHOR QEA

Figure 3-2
Channel Sample Locations and Water Depths
Dredged Material Management Plan
Port of Pascagoula – Channel Widening Project

APPENDIX A

RELEVANT TISSUE CHEMISTRY DATA RESULTS (EA 2011B)

TABLE 21B. MEAN DIOXIN AND FURAN CONGENER CONCENTRATIONS (NG/KG) IN TISSUES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

			REFERENCE SITE B		CONTROL		BCW-05		BCW-06		PLS-01/02	
			Worms	Clams	Worms	Clams	Worms	Clams	Worms	Clams	Worms	Clams
ANALYTE	UNITS	TEF*	Lipids = 0.57%	Lipids = 0.44%	Lipids = 0.55%	Lipids = 0.40%	Lipids = 0.69%	Lipids = 0.38%	Lipids = 0.65%	Lipids = 0.35%	Lipids = 0.68%	Lipids = 0.36%
2,3,7,8-TCDD	NG/KG	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,7,8-PECDD	NG/KG	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4,7,8-HXCDD	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,6,7,8-HXCDD	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,7,8,9-HXCDD	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4,6,7,8-HPCDD	NG/KG	0.01	ND	ND	ND	ND	ND	ND	ND	ND	6.74	5.2*
OCDD	NG/KG	0.0003	16	15.6	16	ND	28.2	36	25.2	53	63.8	66.6
2,3,7,8-TCDF	NG/KG	0.1	ND	ND	ND	ND	ND	ND	1.02	ND	1.04	ND
1,2,3,7,8-PECDF	NG/KG	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,7,8-PECDF	NG/KG	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4,7,8-HXCDF	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,6,7,8-HXCDF	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6,7,8-HXCDF	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,7,8,9-HXCDF	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4,6,7,8-HPCDF	NG/KG	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4,7,8,9-HPCDF	NG/KG	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OCDF	NG/KG	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIOXIN TEQ (ND=1/2RL)	NG/KG	--	4.63	5.68	3.78	5.7	3.32	5.65	2.67	5.65	3.97	15.6
DIOXIN TEQ (ND=RL)	NG/KG	--	9.26	11.4	7.56	11.4	6.63	11.3	5.34	11.3	7.87	31.2

**Source* : Van den Berg, M, et al. 2006. The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. *Toxicological Sciences 93(2):223-241.*

NOTES: For pre-test and control tissues n = 3 and for all other tissue tests n = 5.

* = tissue tests where n = 4 because an outlier was not used to calculate the mean concentration.

Mean concentrations were lipid-normalized prior to statistical comparisons to the reference site.

Nereis virens species used for worm tissue tests and *Macoma nasuta* used for clam tissue tests.

ND = not detected or was detected below the reporting limit in each of the tested tissue replicates.

TEF = toxicity equivalency factor

TEQ = toxicity equivalency quotient

Analyte concentration is significantly higher than the reference site concentration (p>0.05)

Analyte concentration is significantly higher than the reference site concentration (p>0.05) and the pre-test tissue concentration (p>0.05)

TABLE 23. COMPARISON OF THE MEAN TISSUE CONCENTRATIONS TO USEPA REGION 4 BACKGROUND CONCENTRATIONS FROM THE NORTH GULF OF MEXICO[a]

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

		USEPA-REGION 4 BACKGROUND CONCENTRATION - NORTH GULF OF MEXICO[a]		REFERENCE SITE B		BCW-02		BCW-06		PLS-03/04	
ANALYTE[b]	**UNITS**	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***
ARSENIC	MG/KG	7.4 to 37.0	3.4 to 5.4	2.2	2.42	--	--	--	2.82	--	--
COPPER	MG/KG	2.3 to 5.3	0.58 to 2.8	1.22	2.12	1.54	--	1.36	--	--	--
LEAD	MG/KG	0.31 to 1.2	<0.47	0.11	0.326	--	--	--	--	--	**0.746**
DIOXIN TEQ (ND=RL)	NG/KG	0.31 to 0.63	0.16-0.19	**9.26**	**11.4**	--	--	**5.34**	**11.3**	--	--

[a]*Source:* Southeast Regional Implementation Manual (SERIM), USACE/USEPA 2008

[b]Values provided only for metal and dioxin constituents that were tested in this program and stastically exceeded the reference site concentration.

NOTE: Bold and shaded concentrations exceed background concentrations

Metals were not sampled and no dioxin TEQs statistically exceeded reference site concentrations at locations BCW-05 or PLS-01/02.

ND = not detected or was detected below the reporting limit.

DRAFT

MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT (MPRSA) SECTION 103 EVALUATION

EVALUATION OF DREDGED MATERIAL PASCAGOULA HARBOR FEDERAL NAVIGATION CHANNEL IMPROVEMENTS PROJECT

PASCAGOULA, MISSISSIPPI

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MARCH 2011

MARINE PROTECTION RESEARCH AND SANCTUARIES ACT (MPRSA) SECTION 103 EVALUATION

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1. DREDGING AND PLACEMENT PROJECT INFORMATION

The subject of this evaluation is the widening of the Bayou Casotte Channel and Pascagoula Lower Sound Channel by up to 150 ft, and the subsequent placement of dredged material in the Pascagoula (Mississippi) Ocean Dredged Material Disposal Site (ODMDS). The Bayou Casotte and Pascagoula Lower Sound Channels provide access to Bayou Casotte from the Gulf of Mexico.

The U.S. Army Corps of Engineers–Mobile District (USACE–Mobile District) maintains the Pascagoula Harbor channels which provide access to Pascagoula Harbor and Bayou Casotte from the Gulf of Mexico and include the Pascagoula River Channel, Pascagoula Upper and Lower Sound Channels, and Bayou Casotte Channel (Figure 1).

The Pascagoula ODMDS is located south of Horn Island, Mississippi in the Gulf of Mexico (Figure 1). The ODMDS was identified as the potential placement site for dredged material removed from Bayou Cassette and the Pascagoula Lower Sound Channel because previous investigations of the sediment in these channels indicated that the material was suitable for ocean placement.

a. Dredging Location. The Pascagoula Lower Sound Channel is 42 feet deep mean lower low water (MLLW) and 350 feet wide, extending from the bend at the northern end of Horn Island Pass approximately 5 miles north to the "Y" intersection where it meets the Pascagoula Upper Sound and Bayou Casotte Channels The Bayou Casotte Channel is 42 feet deep (MLLW) and 350 feet wide from its junction with the Pascagoula Lower Sound Channel to the northern limit of the northern turning basin in the Bayou Casotte Inner Harbor, for a total distance of approximately 4.6 miles.

b. Geotechnical Borings. No geotechnical borings from the Bayou Casotte or Pascagoula Lower Sound Channels were collected for submittal with this Section 103 Evaluation.

c. Volume of Material to be Dredged. The widening of the Bayou Casotte Channel and the Pascagoula Lower Sound Channel would be conducted in 50-ft increments on either or both sides of the navigation channel to a maximum widening of 150 f eet. A range of channel widening options are being considered, including adding width to only one side of each of the channels (either the East or the West side) or widening each channel by an equal distance on both sides. A total of nine options are being considered, and the approximate quantity of dredged material that would be removed for each option is listed below:

Channel Widening Option	Bayou Casotte Channel (cy)	Pascagoula Lower Sound Channel (cy)	Total New Work Volume (cy)
50 ft on the East	620,000	580,000	1,200,000
100 ft on the East	1,380,000	1,480,000	2,860,000
150 ft on the East	2,180,000	2,420,000	4,600,000
25 ft on each side	640,000	430,000	1,070,000
50 ft on each side	1,360,000	1,000,000	2,360,000
75 ft on each side	2,160,000	1,768,000	3,928,000
50 ft on the West	750,000	420,000	1,170,000
100 ft on the West	1,580,000	1,140,000	2,720,000
150 ft on the West	2,460,000	1,950,000	4,410,000

d. Grain Size of Dredged Material. Previous maintenance sampling of the Pascagoula Lower Sound Channel and Bayou Casotte Channel was conducted by EA Engineering, Science, and Technology (EA) in 2009. The maintenance sediment from the Bayou Casotte Channel was comprised primarily of silt-clay (ranging from 75 to 98) percent, and the sediment from the Pascagoula Lower Sound Channel was comprised primarily of silt-clay (ranging from 73 to 99 percent) (EA 2010b). The reference sediment (Reference Site B) was also comprised primarily of silt-clay (76 percent).

For Pascagoula Harbor Channel Improvements Project, sediments collected from the Bayou Casotte Channel widening areas were comprised primarily of silt-clay (ranging from 70 to 98 percent) and sediments collected from the Pascagoula Lower Sound Channel widening areas were comprised primarily of silt-clay (ranging from 66 to 92 percent). The sediments from Reference Site B were comprised primarily of silt-clay (88 percent) in 2010. Two locations in the Pascagoula Lower Sound Channel widening areas (PLS-04 and PLS-05) were comprised primarily of sand (91 and 88 percent, respectively), and were therefore compared to Reference Site D which was also comprised predominantly of sand (75 percent) (Table 1, Figure 3).

e. Bathymetric Information. Bathymetric surveys of Pascagoula Harbor were conducted and approved by USACE–Mobile District prior to the initiation of sampling, to determine sampling locations. The most recent surveys are provided in Appendix A.

f. Description of the Disposal Area. The Pascagoula ODMDS is located approximately two miles south of Horn Island, Mississippi in the Gulf of Mexico (Figure 1) in an area surrounded by Horn Island to the north, the Pascagoula Ship Channel to the east, the navigation safety fairway to the south, and a north-south line running through Dog Keys Pass to the west. The site provides use for dredged material from the Mississippi Sound and vicinity that passes ocean placement testing, as per Section 103 of the MPRSA. The Pascagoula ODMDS was designated in the *Final Environmental Impact Statement for the Designation of an Ocean Dredged Material Disposal Site Located Offshore Pascagoula, Mississippi* (USEPA 1991). Pascagoula ODMDS covers an area of approximately 18.5 square nautical miles (nmi^2), with depths ranging from approximately 38 feet in the north to 52 feet in the southern section (USEPA/USACE 2006).

USACE-Mobile District completed the *Pascagoula Harbor Navigation Channel Final Supplemental Environmental Impact Statement (FSEIS)* (USACE 2010), which identified the ocean placement at the Pascagoula ODMDS as the most viable placement option for material from the Pascagoula Harbor maintenance and deepening projects that meet the Ocean Dumping Criteria, but is not suitable for beach nourishment. The Pascagoula ODMDS was designated to accommodate new work material and long-term maintenance placement needs for dredge material from the Pascagoula Harbor Federal navigation project (the Pascagoula River, Pascagoula Upper and Lower Sound, and Bayou Casotte Channels); for maintenance material from the channels and turning basin associated with Naval Station Pascagoula, and possibly by private entities.

The boundary coordinates of the Pascagoula ODMDS are (USEPA/USACE 2006):

Boundary Coordinates

Latitude	Longitude
30°12’06” N	88°44’30” W
30°11’42” N	88°33’24” W
30°08’30” N	88°37’00” W
30°08’18” N	88°41’54” W

g. Expected Start, Duration and End of Dredging. The dredging for the Pascagoula Improvements project will be conducted by a non-Federal sponsor, the Jackson County Port Authority. At this time, dredging for the project is anticipated to be in late 2014 or early 2015. Maintenance of the channels, thereafter, will be conducted on an as-needed schedule, based on the rate of shoaling in the channel, as documented by annual bathymetric surveys.

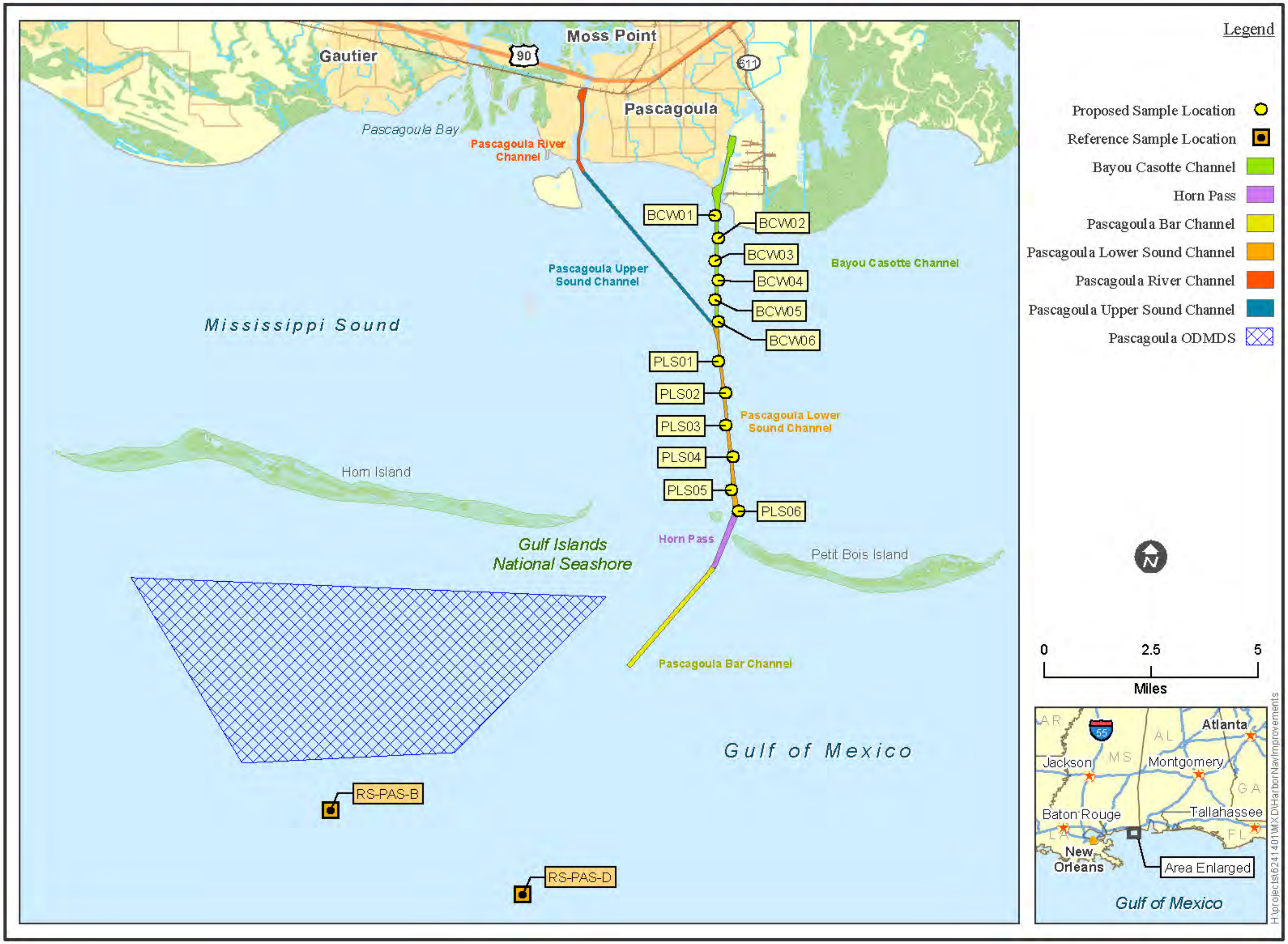

Figure 1. Pascagoula Improvements Project Sampling Locations in 2010

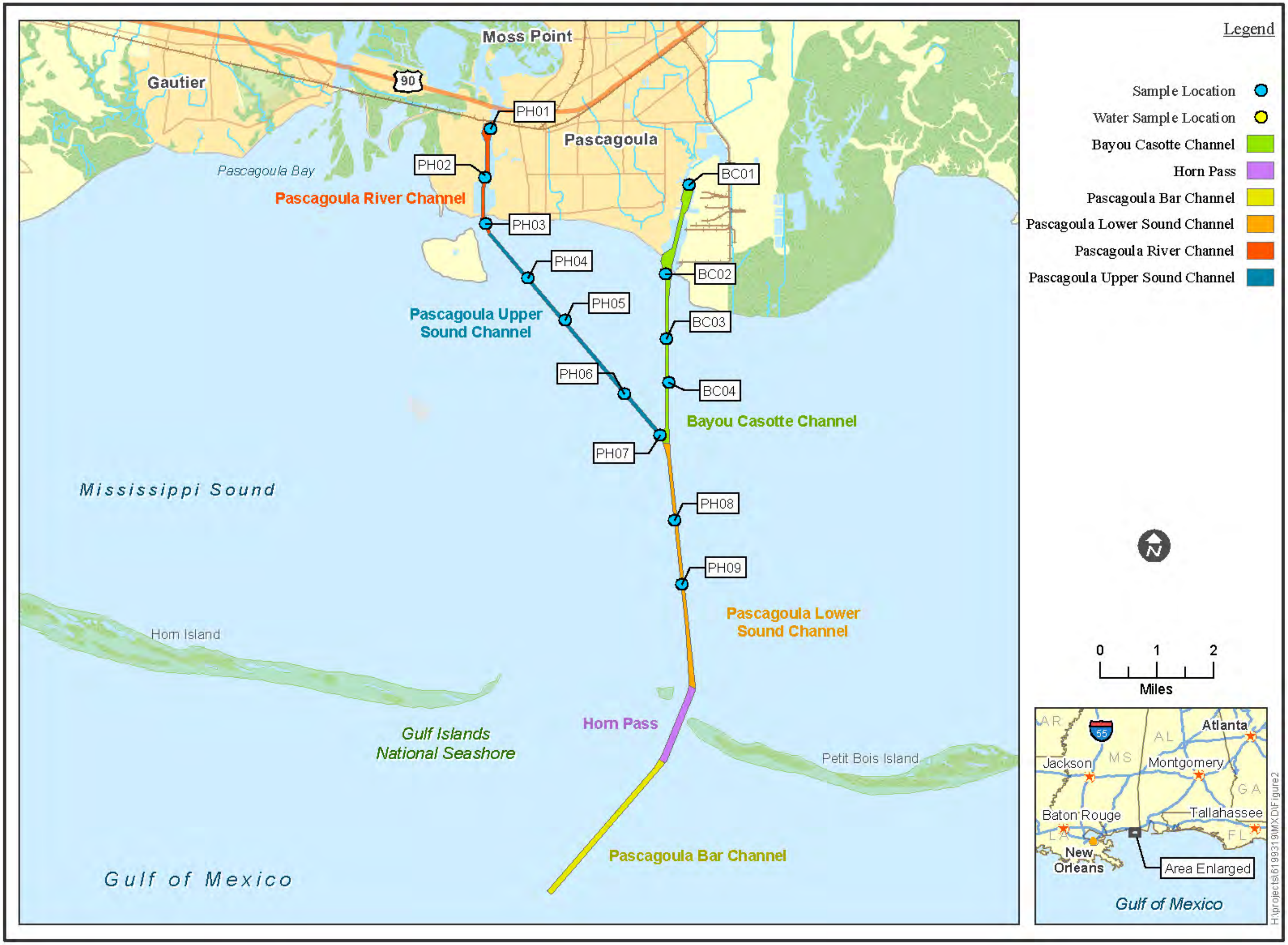

Figure 2. Previous Maintenance Sediment Sampling Locations: Pascagoula Harbor Sampling, 2009

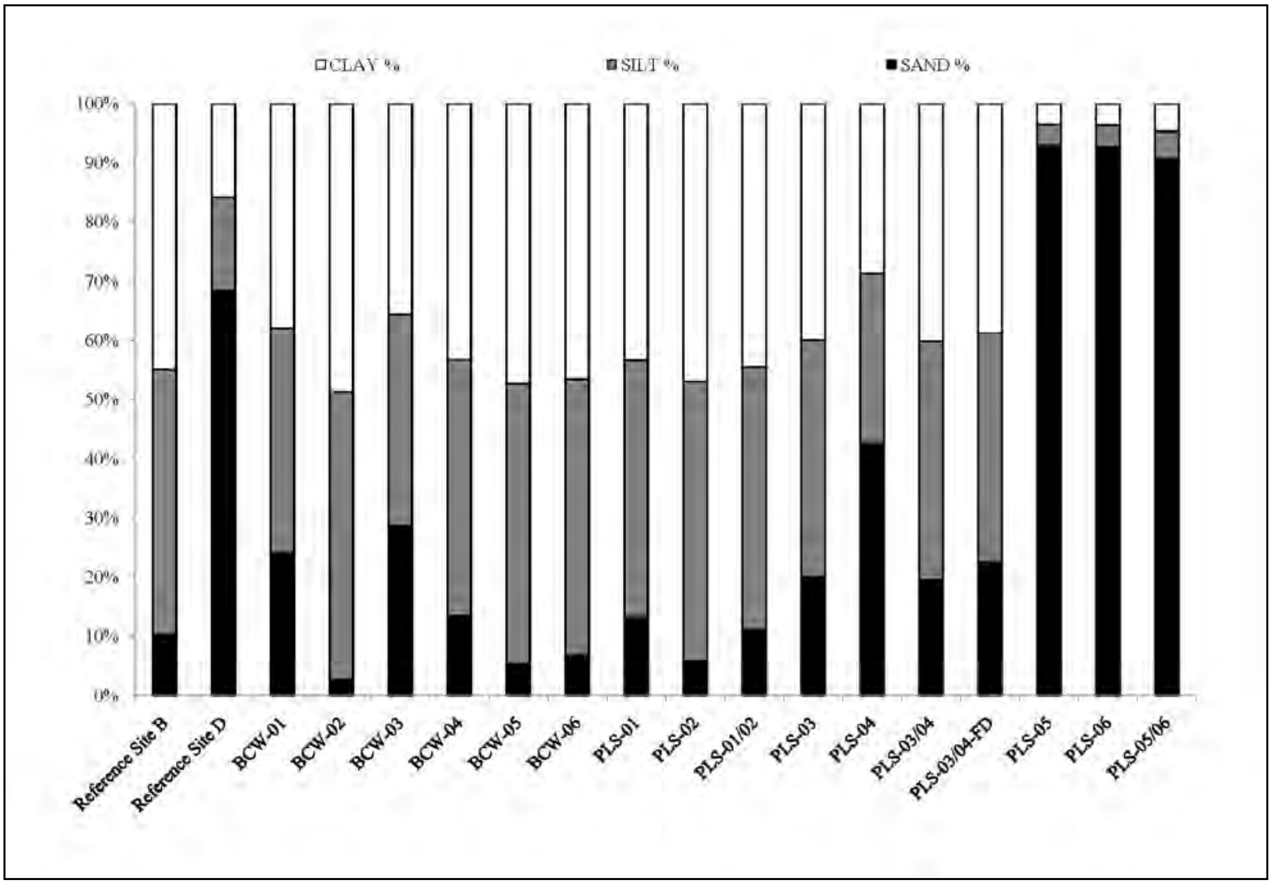

Figure 3. Grain Size Distribution in Bayou Casotte, Pascagoula Lower Sound, and Reference Site Sediments
Source: EA Engineering, Science and Technology, Inc. 2011

h. Location of Placement within ODMDS. Placement of dredged material from the Pascagoula River, Pascagoula Lower and Upper Sound, and Bayou Casotte Channels was modeled using the USACE Short Term Fate of Dredged Material Disposal in Open Water Model (STFATE model), which simulates the placement of dredged material during ocean placement as it falls through a water column, spreads over the bottom and is transported as suspended sediment by the ambient current. The STFATE modeling initially assumed that 4,000 cy of dredged material would be placed at the center of the Pascagoula ODMDS during each placement event. Grain size and other physical characteristics of the sediment, as well as concentrations of receiving water, were used as input parameters. STFATE modeling determined the dilution factor of the plume 1 and 4 hours after placement, and how far the leading edge of the plume would travel within 4 hours after placement to ensure that the plume stayed within the boundaries of the placement site.

The actual location of placement within the Pascagoula ODMDS will be determined in coordination with USEPA Region 4 and USACE-Mobile District prior to the start of dredging. According to the SMMP, placement shall occur no less than 330 feet (100 meters) inside the site boundaries such that the material and placement methods shall prevent mounding from becoming an unacceptable navigation hazard.

Since currents tend to be predominantly west-southwest or west-northwest in the Pascagoula ODMDS, initial disposal of fine material will be made in the easternmost portions of the selected site, to the extent practical, to ensure that material does not migrate offsite. Sediment mapping information indicated that the central and southernmost portion of the site are comprised predominantly of finer-grained material, therefore, when possible, consideration shall be made to dispose of fine-grained material in this area, and disposal of coarse-grained material in the northern portion of the Pascagoula ODMDS (USEPA/USACE 2006).

i. Compliance with ODMDS Site Designation Conditions. The USACE or its contractors will perform after placement detailed bathymetric surveys of the designated ODMDS placement within 30 days of placement project completion. The number and lengths of the transects required will be sufficient to encompass the entire area of the ODMDS that was utilized, plus a 500-ft wide area around the area. Additional bathymetric surveys would be performed as necessary should concerns be raised concerning the placement location and even distribution of dredged material.

USACE-Mobile District will notify USEPA 15 p rior to the beginning of dredged material placement at the Pascagoula ODMDS, and USACE-Mobile District is required to provide a placement summary report to USEPA within 90 days after project completion.

No specific placement techniques are required for this site, however, to protect sea turtles and Gulf sturgeon, National Marine Fisheries Service (NMFS) requires monitoring according to the *Regional Biological Opinion for Dredging of Gulf of Mexico Navigation Channels and Sand Mining ("Borrow") Area Using Hopper Dredged by Corps Galveston, New Orleans, Mobile, and Jacksonville Districts* (NMF 2003). In addition, standard surveillance and evasive measures to protect sea turtle and marine mammals shall be employed during all disposal operations at the ODMDS (USEPA/USACE 2006).

USACE has implemented the use of Automated Dredging Quality Assurance Monitoring (Silent Inspector) developed by USACE-Engineering, Research, and Development Center (ERDC). The Silent Inspector automatically monitors numerous dredge parameters in real-time on a 24 hour / 7 day a week basis. For the Pascagoula Harbor project, the Silent Inspector will provide the capability to track scow transit from the project site the Pascagoula ODMDS and to track placement activities within the Pascagoula ODMDS.

2. EXCLUSIONARY CRITERIA

The exclusionary criteria apply to material which meets any of the following three criteria (40 CFR Part 227.13) to be considered environmentally acceptable for ocean placement without further Tier II (chemical) or Tier III (ecotoxicological) testing:

1. The dredged material is comprised predominately of sand, gravel, rock, or any other naturally occurring bottom material with particle sizes larger than silt, and the material is found in areas of high current or wave energy.

2. Dredged material is for beach nourishment or restoration and is comprised predominately of sand, gravel, or shell with particle sizes comparable with material on the receiving beaches.

3. When:

   i) the material proposed for placement is substantially the same as the substrate at the proposed placement site; and

   ii) the site from which the material proposed for placement is to be taken is far removed from known sources of pollution so as to provide reasonable assurance that such material has not been contaminated by such pollution.

Based on sampling and physical/chemical testing conducted in 2010 (EA 2011a) the material proposed for dredging from the Bayou Casotte and Pascagoula Lower Sound Channels does not meet the exclusionary criteria because of its high silt and clay content.

3. NEED FOR TESTING FOR OCEAN PLACEMENT

a. Requirement for Testing. The Pascagoula Harbor Improvements Project is new work dredging, so no previous testing was conducted for this material. In addition, the material does not meet the exclusionary criteria set forth under Section 40 CFR 227.13(b). Therefore, testing in accordance with 40 CFR Section 227.32 was required.

b. Authorization and Dates of Previous Dredging. The project under evaluation is new work dredging in the proposed widening areas in Pascagoula Lower Sound and Bayou Casotte Channels. USACE–Mobile District is responsible for maintenance dredging, as needed, of Pascagoula Harbor Federal Navigation Channels, Mississippi, which were authorized by the Rivers and Harbors Act of August 8, 1917, and modified by the Rivers and Harbors Acts of January 21, 1927; July 3, 1930; October 7, 1940; March 2, 1945; July 3, 1958; and December 31, 1970.

The Pascagoula Harbor Navigation Channel Improvement project is new work dredging. Therefore, dredging in the proposed widening areas, and to the target depths for this project have not been previously conducted.

c. Results of Previous Testing. The most recent sampling event to characterize widening material was conducted by EA in 2010 (EA 2011a) (Figure 1). Previous sampling to characterize maintenance material (0 to approximately 10 ft below the sediment surface) from the Bayou Casotte and Pascagoula Lower Sound Channels (Figure 2) (EA 2010b) included bulk sediment analysis, standard elutriate testing (Tier II), water column bioassays, whole sediment bioassays, and bioaccumulation studies (Tier III) of sediment samples proposed for maintenance dredging.

The testing program for the Pascagoula Navigation Channel Improvements project was similar to the maintenance project conducted in 2009, which determined that the maintenance sediments from the Bayou Casotte and Pascagoula Lower Sound Channels were suitable for ocean placement, as described below.

The results from the Pascagoula Navigation Channel Maintenance project (EA 2010b), approved by USEPA-Region 4, indicated that the sediment (0 to approximately 10 ft below the sediment surface) from the Bayou Casotte and Pascagoula Lower Sound Channels met the Limiting Permissible Concentration (LPC) for water column and whole sediment bioassays. In addition, the results of the bioaccumulation exposure indicated little potential for bioaccumulation of contaminants. However, because the Pascagoula Harbor Improvements Project is new work dredging, testing was required for material in the proposed widening areas in Bayou Casotte and Pascagoula Lower Sound Channels to the target depth (ranging from 6 to 20 ft below the sediment surface).

d. Locations for Previous Testing. Locations of the previous testing are shown in Figure 2.

e. Recent Events Influencing Testing Results. On 20 April 2010 *The Deepwater Horizon,* exploded in the Gulf of Mexico while drilling on the Macondo oil well approximately 41 miles southeast of Louisiana. Oil from the well spilled into the Gulf until it was capped on 15 July 2010. A sampling effort was conducted by EA on behalf of USACE–Mobile in late-November and early-December 2010 to determine if the surface sediment quality in the Pascagoula Harbor Federal Navigation Channels was impacted by the oil spill. Based on results of PAH and total petroleum hydrocarbon (TPH) testing of surface sediments collected in the Bayou Casotte and Pascagoula Lower Sound Channels, two USEPA-designated reference sites, and the Pascagoula ODMDS in November and December 2010, there were no discernable changes noted in the sediment quality that could be attributed to the *Deepwater Horizon* Oil Spill (EA 2011b).

4. WATER COLUMN DETERMINATIONS

In early-April 2010, tiered testing following protocols in *The Ocean Testing Manual (OTM)* (USACE/ USEPA 1991) and the *Southeast Regional Implementation Manual* (*SERIM)* (USEPA/USACE 2008) was conducted for composite sediment samples collected from twelve locations within the proposed dredging area (Figure 1) and one reference site. Results of the studies and a description of the sampling and chemical testing methodologies are detailed in *Evaluation of Dredged Material: Pascagoula Harbor, Pascagoula, Mississippi, Sampling and Analysis Plan (*EA 2010a) and the *Evaluation of Dredged Material: Pascagoula Harbor Navigation Channel Improvements Project, Pascagoula, Mississippi* (EA 2011a). The goal of the project was to sample six locations in the Bayou Casotte Channel and six locations in the Pascagoula Lower Sound Channel, and submit samples from each location for physical, chemical, standard elutriate, and ecotoxicological analysis.

Sediment samples for the proposed widening areas in the Bayou Casotte and Pascagoula Lower Sound Channels, were collected using a vibracoring system to a target depth of 46 feet MLLW. Multiple cores from each location were homogenized together to create composite sediment samples. Water was collected from mid-depth in the water column from one location in the

Bayou Casotte Channel and one location in the Pascagoula Lower Sound Channel using an ISCO peristaltic pump with dedicated Tygon tubing. Surficial sediment from the Pascagoula reference sites (Reference Site B and D) was sampled using a Van Veen stainless steel grab sampler. Multiple grabs from each location were composited in a 55-gallon stainless steel holding container that was decontaminated between each location.

a. Sediment Testing. Target analytes for the 2010 sediment testing were chosen based on consultation with USEPA-Region 4. Results of the physical and chemical testing of the bulk sediment from Pascagoula Harbor and comparisons to marine sediment quality guidelines (SQGs) [MacDonald et al. 1996; Canadian Council of Ministers of the Environment (CCME) 2001] are summarized in Tables 1 through 9. Sediments, site water, and standard elutriates were tested for the following target compounds:

- metals,
- chlorinated pesticides,
- PCB congeners,
- SVOCs,
- PAHs,
- dioxin and furan congeners,
- ammonia (NH_3-N),
- TKN,
- nitrate+nitrite,
- total phosphorus,
- TOC,
- total sulfide,
- cyanide,
- butyltins,
- SEM (sediment only), and
- AVS (sediment only).

In addition, the following physical analyses were conducted for the bulk sediment samples:

- grain size determination,
- specific gravity, and
- percent solids.

Detailed results of the bulk sediment testing from 2010 are provided in *Evaluation of Dredged Material: Pascagoula Harbor Navigation Channel Improvements Project, Pascagoula, Mississippi* (EA 2011a).

The results of the grain size analysis were previously summarized in Section 1(d) (Figure 3 and Table 1) of this evaluation. Of the 161 tested chemical constituents, 69 (43 percent) were detected in the sediments from the Bayou Casotte and Pascagoula Lower Sound Channel widening area (Tables 2 to 9).

Concentrations of analytes detected in the sediments from Bayou Casotte and Pascagoula Lower Sound Channel widening areas were generally higher than concentrations of analytes detected at the reference sites. None of the tested chemical constituents were detected at concentrations exceeding probable effects level (PEL) values.

TOC concentrations in the sediments from the Bayou Casotte and Pascagoula Lower Sound Channel widening areas ranged from 1.0 to 1.82 percent and 0.082 to 0.898 percent, respectively (Table 2). Arsenic concentrations were between the threshold effects level (TEL) and PEL values at each location in the Bayou Casotte Channel, except BCW-01, and exceeded the TEL value by factors ranging from 1.1 to 1.5. Arsenic concentrations were between the TEL and PEL values in one sample (PLS-03/04) from the Pascagoula Lower Sound Channel, exceeding the TEL value by a factor of 1.4 (Table 3).

PAHs were generally detected at low concentrations. Total PAH concentrations [non-detect = half of the method detection limit (ND=½MDL)] in the sediments from the Bayou Casotte and Pascagoula Lower Sound Channel widening areas were each below the TEL value (1,684 µg/kg) (Table 4). Total PCB concentrations (ND=½MDL) for the Bayou Casotte and Pascagoula Lower Sound sediments were also below the TEL value (21.6 µg/kg) at each of the sampling locations (Table 5).

Chlorinated pesticides were generally detected at low levels, none of which exceeded TEL values (Table 6). Dioxin and furan congeners were detected at low levels, frequently estimated at concentrations below the laboratory reporting limit (RL). The most toxic dioxin congener, 2,3,7,8-TCDD, was detected in two of the nine samples at low concentrations. The dioxin toxicity equivalency quotient (TEQs) [non-detect = half of the reporting limit (ND=½RL)] from the Bayou Casotte and Pascagoula Lower Sound sediments ranged from 0.662 ng/kg to 30.1 ng/kg (Table 7). SVOCs were detected infrequently and at low concentrations, often below the reporting limit (Table 8). None of the butyltins was detected in any of the sediment samples (Table 9).

b. Water Column Elutriate Testing. A total of two site water samples from the Bayou Casotte Channel and the Pascagoula Lower Sound Channel were used to create nine standard elutriate samples. Results of the site water and standard elutriate chemical analyses are presented in Tables 10 through 17. Receiving water from the ODMDS was also collected and submitted for chemical analysis for use in the STFATE modeling. Details of the elutriate analysis are provided in *Evaluation of Dredged Material: Pascagoula Harbor Navigation Channel Improvements Project, Pascagoula, Mississippi* (EA 2011a).

Elutriate Preparation Water

Of the 162 constituents tested in each site water sample, 41 (25 percent) were detected, with PAHs detected most frequently in the Bayou Casotte site water and metals detected most frequently in the Pascagoula Lower Sound. The majority of the detected constituents were detected at low concentrations and were below USEPA saltwater acute and/or chronic water quality criteria. Chlorinated pesticides, PCBs, SVOCs, and dioxins were infrequently detected in the site water samples and no butyltins were detected (Tables 10 through 17).

Standard Elutriate Chemistry: Bayou Casotte and Pascagoula Lower Sound

Nine standard elutriate samples were tested for the Pascagoula Harbor Channels Improvements project. Standard elutriates were created using six discrete sediment samples and the site water sample collected from Bayou Casotte, and three composite samples and the site water sample collected from Pascagoula Lower Sound.

In the standard elutriate samples, 50 of the 162 target analytes (31 percent) were detected. Generally, detected concentrations were low, but concentrations of several constituents exceeded USEPA saltwater chronic and/or acute water quality criteria. Ammonia, dissolved cyanide, copper, nickel, 4,4'-DDT, endrin, and heptachlor concentrations each exceeded the USEPA saltwater chronic and/or acute water quality criteria in at least one standard elutriate sample from the Bayou Casotte and Pascagoula Lower Sound Channels.

Bayou Casotte

Ammonia was detected in each elutriate above the USEPA calculated acute and chronic water quality criteria. In the Bayou Casotte elutriates, ammonia exceeded the chronic water quality criterion (0.875 mg/L) by a factors ranging from 10.3 to 28.8 and the acute criterion (5.83 mg/L) by factors ranging from 1.5 to 4.3. Dissolved cyanide concentrations in sample BCW-04 exceeded acute (1 µg/L) and chronic (1 µg/L) water quality criteria by a factor of 1.6 (Table 10).

Copper concentrations in two of the standard elutriates from Bayou Casotte (BCW-01 and BCW-03) exceeded the acute (4.8 µg/L) and chronic (3.1 µg/L) water quality criterion by factors ranging from 1.3 to 2.4 and 2.0 to 3.8, respectively. Nickel concentrations in elutriate sample BCW-03 exceeded chronic water quality criteria (8.2 µg/L) by a factor of 1.0 (Table 11).

The 4,4'-DDT concentration (0.0067 µg/L) in one standard elutriate (BCW-02) exceeded the USEPA chronic water quality criterion (0.001 µg/L) by a factor of 6.7. The endrin concentration in elutriate sample BCW-04 (0.0077 µg/L) exceeded the chronic water quality criteria (0.0023 µg/L) by a factor of 3.4. Heptachlor concentrations in standard elutriates BCW-01 and BCW-02 (0.0073 µg/L and 0.024 µg/L, respectively) exceeded the USEPA chronic water quality criterion (0.0036 µg/L) by factors of 2.0 and 6.7 (Table 12).

Pascagoula Lower Sound

In the Pascagoula Lower Sound elutriates, ammonia exceeded the chronic water quality criterion (0.553 mg/L) by factors ranging from 1.4 to 37.1 and the acute criterion (3.68 mg/L) by factors ranging from 3.5 to 5.6. Copper concentrations in one standard elutriate from Pascagoula Lower Sound (PLS-03/04) exceeded the acute (4.8 µg/L) and chronic (3.1 µg/L) water quality criterion by factors of 2.7 and 4.1, respectively.

Generally, the concentrations of metals in the standard elutriates were similar to those detected in the site water, and were much lower than the concentrations detected in the sediment. Therefore, the potential for release of dissolved metals into the water column during open-water placement is expected to be low. Organic constituents tested in the Bayou Casotte and Pascagoula Lower Sound Channels were detected infrequently, and the detected concentrations were generally low. None of the tested butyltins was detected in the standard elutriates (Tables 13 through 17).

STFATE Modeling and Limiting Permissible Concentration (LPC) Compliance

To determine the LPC compliance for proposed widening material from the Bayou Casotte and Pascagoula Lower Sound Channels, the STFATE model was used to model the behavior of the sediment during placement at the Pascagoula ODMDS (Attachment I). Modeling of the dilution rate using the specifications (i.e., dimensions and water column properties) of the Pascagoula ODMDS was conducted to confirm that sufficient dilution would be achieved within the 4-hour period inside the boundary of the Pascagoula ODMDS to achieve USEPA water quality standards.

Comparisons to USEPA water quality criteria indicated that the constituent that had the greatest potential to be released into the water column at elevated concentration from the sediments during open water placement was ammonia for both Bayou Casotte and Pascagoula Lower Sound.

Bayou Casotte

Based on the calculated chronic (0.875 mg/L) ammonia criteria, a maximum 29-fold dilution of the full strength elutriate would be required to comply with the acute ammonia criterion inside the boundary of the ocean placement site. For placement of 4,000 cy of material from the Pascagoula River, results of the STFATE modeling indicated that a 318-fold dilution would occur within 4-hours following placement at the ODMDS, which would be sufficient to achieve the dilution required to meet the acute water quality criterion for ammonia. The STFATE model indicated that 4-hours following placement of the Bayou Casotte sediments, the leading edge of the plume was estimated to travel approximately 1,914 feet from the placement location and remained within the boundary of the placement site. ***Therefore, Bayou Casotte elutriates meet the LPC for water quality criteria for ocean placement at the Pascagoula ODMDS.*** STFATE modeling indicated that the sediment from the Bayou Casotte channel would meet the water quality LPC using dredged material placement events up to 8,000 cy.

Pascagoula Lower Sound

Based on the calculated chronic (0.553 mg/L) ammonia criteria, a maximum 38-fold dilution of the full strength elutriate would be required to comply with the acute ammonia criterion inside the boundary of the ocean placement site. For placement of 4,000 cy of material from the Pascagoula Lower Sound, results of the STFATE modeling indicated that a 415-fold dilution would occur within 4-hours following placement at the ODMDS, which would be sufficient to achieve the dilution required to meet the acute water quality criterion for ammonia.

The STFATE model indicated that 4-hours following placement of the Pascagoula Lower Sound sediments, the leading edge of the plume was estimated to travel approximately 1,914 feet from the placement location and remained within the boundary of the placement site. ***Therefore, Pascagoula Lower Sound elutriates meet the LPC for water quality criteria for ocean placement at the Pascagoula ODMDS.*** STFATE modeling indicated that the sediment from the Pascagoula Lower Sound channel would meet the water quality LPC using dredged material placement events up to 14,000 cy.

c. Water Column Bioassays. Three water column species, *Mytilus edulis* (blue mussel), *Menidia beryllina* (inland silverside), and *Americamysis bahia* (opossum shrimp) were exposed to elutriates created from six individual samples from Bayou Casotte and three sediment composite samples from Pascagoula Lower Sound. The blue mussel tests measured developmental effects to embryos, and the opossum shrimp and inland silverside tests measured effects to organism survival. The test protocols are detailed in, *Evaluation Of Dredged Material: Pascagoula Harbor Navigation Channel Improvements Project, Pascagoula, Mississippi* (EA 2011a).

The survival in a few of the 100% elutriates for *M. beryllina* and *A. bahia* were significantly different than the control sample. However, each of the *M. beryllina* and *A. bahia* water column bioassays had 96-hour LC_{50}s of greater than 100 percent elutriate. The *M. edulis* water column bioassay evaluates larval development, and was the most sensitive (thus restrictive) test conducted on the elutriates. The EC_{50} concentrations for *M. edulis* were significantly different than the control sample for eight of the nine locations (PLS-05/06-SED was not significantly different). After 48 hours of exposure, the EC_{50} values ranged from 57.9 to greater than 100 percent normal development. (Table 18).

STFATE Modeling and LPC Compliance

STFATE modeling was conducted using specifications (i.e., dimensions and water column properties) of the placement site to determine if the results of the water column bioassays for the most senstivite species *(M. edulis)* would meet the water column LPC for ocean placement. The input and output information for the STFATE modeling is provided in Attachment I. The water column LPC for ocean placement is equivalent to 0.01 percent of the EC_{50}/LC_{50} within a 4-hour dilution period inside the boundary of the placement site (USEPA/USACE 1991).

Bayou Casotte

The lowest EC_{50}/LC_{50} value for the elutriate water column bioassays for Bayou Casotte (57.9 percent for elutriate sample BCW-02) would require a dilution or mixing of approximately 173-fold to achieve the LPC for Bayou Casotte (Table 18).

The STFATE modeling using a 4,000 cy placement volume indicated that a 318-fold dilution for Bayou Casotte sediments would occur within the first 4 hours following placement within the placement site boundary. ***Therefore, the Bayou Casotte elutriates meet the LPC for water column toxicity for ocean placement at the Pascagoula ODMDS.*** STFATE modeling indicated that the sediment from the Bayou Casotte channel would meet the water toxicity LPC using dredged material placement events up to 8,000 cy.

Pascagoula Lower Sound

The lowest EC_{50}/LC_{50} value for the elutriate water column bioassays for Pascagoula Lower Sound (62.5 percent for PLS-03/04) would require a dilution or mixing of approximately 160-fold to achieve the LPC for Pascagoula Upper Sound (Table 18).

STFATE modeling using a 4,000 cy placement volume indicated that a 415-fold dilution for Pascagoula Lower Sound sediments would occur within the first 4 hours following placement within the placement site boundary. ***Therefore, Pascagoula Lower Sound elutriates meet the LPC for water column toxicity for ocean placement at the Pascagoula ODMDS.*** STFATE modeling indicated that the sediment from the Pascagoula Lower Sound channel would meet the water toxicity LPC using dredged material placement events up to 14,000 cy.

5. BENTHIC DETERMINATION

a. Benthic Toxicity Evaluation. Whole sediment bioassays were conducted with an estuarine amphipod, *Leptocheirus plumulosus* and an estuarine polychaete, *Neanthes arenaceodentata*. The tests were conducted as static, non-renewal tests with 10 days of exposure to the whole sediments and overlying water and measured survival in the Bayou Casotte and Pascagoula Lower Sound sediment as compared to survival in the reference sediment (Table 19). The test protocols are detailed in *Evaluation of Dredged Material: Pascagoula Harbor Navigation Channel Improvements Project, Pascagoula, Jackson County Mississippi* (EA 2011a).

Sediments from the Pascagoula Harbor Channels were not acutely toxic to *L. plumulosus* (88 to 100 percent survival) or *N. areanceodentata* (82 to 98 percent survival). None of the samples had a survival rate that was significantly less that the survival in the reference site sediment (Table 19).

LPC Compliance

The evaluation of benthic-effects for whole sediment bioassays is based on the LPC. The LPC is defined as "…that concentration which will not cause unreasonable acute or chronic toxicity or sublethal adverse effects based on bioassay results using…appropriate sensitive marine organisms…" (USACE/USEPA 1991 and 1998). The dredged material proposed for placement does not meet the LPC if the mortality of the test organisms (1) is statistically greater than mortality in the reference sediment, and (2) exceeds the reference sediment mortality by at least 10 percent (or 20 percent for amphipod tests).

None of the sediment samples from the Pascagoula Harbor Navigation Channel Improvements Project exhibited significantly lower survival than the reference locations. ***Therefore, the sediments from the Pascagoula Harbor Navigation Channel Improvements Project meet the LPC for benthic toxicity.***

b. Benthic Bioaccumulation. Sediments from the Bayou Casotte and Pascagoula Lower Sound were evaluated in 28-day bioaccumulation studies with *Nereis virens* (sand worm) and *Macoma nasuta* (blunt-nose clam). The studies measured survival of the test organisms and the potential for bioaccumulation of contaminants in organism tissue as a result of exposure to Bayou Casotte and Pascagoula Lower Sound sediment samples. The bioaccumulation exposure and chemical testing protocols are detailed in *Evaluation of Dredged Material: Pascagoula Harbor Navigation Channel Improvements Project, Pascagoula, Jackson County Mississippi* (EA 2011a).

Survival

Six individual samples from Bayou Casotte and three composite samples from the Pascagoula Lower Sound were tested. Survival for *N. virens* and *M. nasuta* was not significantly different than the reference site in any of the nine samples tested. Survival in the *N. virens* bioaccumulation test after 28 days of exposure ranged from 97 to 99 percent, and survival in the

M. nasuta bioaccumulation test after 28 days of exposure ranged from 91 to 96 percent (Table 20).

Tissue Contaminant Analysis

Tissue samples exposed to the sediments from Bayou Casotte and Pascagoula Lower Sound, Pascagoula Reference Sites B and D, and pre-test and control tissues were submitted for analysis. USEPA-Region 4 requested that tissues be analyzed for metals and dioxin and furan congeners at specific samples from the channels. The following table depicts each location and its desired analytical suite:

Analyte	Reference Site B	Bayou Casotte Channel			Pascagoula Lower Sound	
		BCW-02	BCW-05	BCW-06	PLS-01/02	PLS-03/04
Metals	X	X	--	X	--	X
Dioxin and Furan Congeners	X	--	X	X	X	--

The tissue contaminant concentrations for *N. virens* and *M. nasuta* following exposure to dredged material were compared to tissue contaminant concentrations for organisms similarly exposed to the reference sediment. In accordance with the *SERIM* (USEPA/USACE 2008), mean tissue concentrations that statistically exceeded mean reference concentrations were compared to USEPA-Region 4 approved, regional background tissue concentrations.

Tissue Chemistry Results

Detailed results of the tissue chemistry analysis are provided in *Evaluation of Dredged Material: Pascagoula Harbor Navigation Channel Improvements Project, Pascagoula, Jackson County Mississippi* (EA 2011a). Results of the tissue analysis for *N. virens* and *M. nasuta* are summarized in Table 21A and 21B. Analyte concentrations in pre-test tissues are also provided in Table 21A and 21B.

<u>Comparison to U.S. Food and Drug Administration (USFDA) Action Levels</u>

The upper 95 percent confidence levels of the mean (UCLM) tissue-residue concentrations for arsenic, cadmium, chromium, lead, and nickel in worm and clam tissues exposed to Bayou Casotte and Pascagoula Lower Sound sediments were compared to USFDA Levels (USFDA 2000 and 2001). None of the UCLM values for Bayou Casotte or the Pascagoula Lower Sound tissues exceeded the USFDA Action Levels for metals (Table 22).

Comparisons of the mean metal concentrations in worm and clam tissue to the mean metal concentrations in worm and clam tissue at the reference location indicated that the mean concentrations of the following metals exceeded the reference site concentration:

- Arsenic in clam tissue (BCW-06);
- Copper in worm tissue (BCW-02, and BCW-06); and

- Lead in clam tissue (PLS-03/04).

Exceedances of the reference site concentration, pre-test concentration, and USEPA Region IV background concentration range (Table 23) were found for lead in clam tissue (Table 21A), which could indicate the potential for ecologically significant uptake of this analyte. The concentrations of the remaining analytes did not statistically exceed pre-test concentrations, indicating that these metal concentrations were comparable to the concentrations in the clams and worms when they arrived at the lab, prior to the bioaccumulation tests; therefore, these statistical exceedances of reference site concentrations most likely represent natural variability and do not indicate ecologically significant uptake. The concentration of lead in clam tissue from PLS-03/04 did exceed USEPA-Region 4 background tissue concentrations (Table 23).

Dioxin and furan congener analyses were conducted for *N. virens* and *M. nasuta* tissues exposed to the sediment samples from Pascagoula Harbor locations BCW-05, BCW-06, and PLS-01/02. Comparisons of the mean dioxin and furan congener concentrations in worm and clam tissue to the mean dioxin and furan concentrations in worm and clam tissue at the reference location indicated that the mean concentration of congener 1,2,3,4,6,7,8-HPCDD exceeded the reference site concentration in clam tissue (PLS-01/02), and the mean concentration of OCDD exceeded the reference site concentration in clam tissue (BCW-05, BCW-06, and PLS-01/02) and worm tissue (BCW-05 and PLS-01/02) (Table 21B).

Exceedances of both the reference site and pre-test concentrations were found for OCDD in clam tissue (BCW-05, BCW-06, and PLS-01/02) and worm tissue (PLS-01/02) (Table 21B), which could indicate the potential for ecologically significant uptake of OCDD. At the remaining locations for which exceedances of reference site concentrations were noted, 1,2,3,4,6,7,8-HPCDD and OCDD did not exceed the pre-test concentrations, which indicates that post-test 1,2,3,4,6,7,8-HPCDD and OCDD concentrations at these locations were comparable to the concentrations in the test organisms when they arrived at the lab, prior to the bioaccumulation tests; therefore, these statistical exceedances of reference site concentrations most likely represent natural variability and do not indicate ecologically significant uptake.

Although the dioxin TEQ (ND=RL) for clam tissues exposed to sediment from BCW-06 exceeded the dioxin TEQ for the reference site, none of the dioxin TEQs exceeded both the reference site and pre-test dioxin TEQs, indicating that the few instances in which OCDD was detected in the clam and worm tissue at concentrations above both the reference and pre-test concentrations most likely do not represent levels that would produce a toxic effect. Additionally, the toxicity equivalency factor (TEF) for OCDD is 0.0003, indicating that it is the least toxic dioxin congener.

LPC Compliance for Bioaccumulation

There are several lines of evidence to indicate that the mean concentrations of detected analytes in the tissue samples exposed to the sediment from the Pascagoula Harbor Navigation Channel Improvements Project are not ecologically significant, and therefore meet the LPC for ocean placement.

- Few analytes in the channel tissues had mean concentrations that statistically exceeded both reference site and pre-test concentrations.

- Lead was the only metal which had a mean concentration (clam tissue at PLS-03/04) that statistically exceeded the mean reference site and mean pre-test concentrations. The mean lead concentration in clam tissue at PLS-03/04 (0.746 mg/kg) was also above the Region 4 Background concentration (0.47 mg/kg).

- None of the detected metals had UCLM values that exceeded the USFDA/USEPA Tolerance/Guidance levels.

- OCDD, the least potentially toxic and most ubiquitous dioxin congener (TEF = 0.0003), was the only dioxin or furan congener which had a mean concentration that statistically exceeded both the mean reference site and pre-test concentrations.

- None of the dioxin TEQs exceeded both the reference site and pre-test dioxin TEQs, indicating that the few instances in which OCDD was detected in the clam and worm tissue at concentrations above both the reference and pre-test concentrations most likely do not represent levels that would produce a toxic effect.

Based on the assessment of metals and dioxin and furan congeners in tissues exposed to the sediments from the Pascagoula Harbor Navigation Channel Improvements Project and sediment from the reference site, it is not anticipated that ocean placement of the dredged material at the Pascagoula ODMDS will result in ecologically significant bioaccumulation of contaminants. ***However, consultation and formal concurrence by USEPA Region 4 regarding the lead concentrations would be required prior to placement to ensure that sediments from the Pascagoula Harbor Navigation Channel Improvements Project meet the LPC for benthic bioaccumulation, as required by 40 CFR Part 227.13 (c) (3).***

6. MPRSA SECTION 103 OCEAN DISPOSAL CRITERIA COMPLIANCE EVALUATION

a. Compliance with 40 CFR Part 227 Subpart B – Environmental Impact. The following criteria were evaluated to determine that the proposed dredged material placement would not degrade the marine environment, and that the dredged material placement would not produce an unacceptable adverse effect on human health or on the ocean for other future uses.

1) The material dredged from the project area does not contain any of the prohibited materials listed in 40 CFR Section 227.5 including radioactive waste, material used in radiological, chemical or biological warfare, or persistent inert synthetic or natural materials that may float and thus interfere with legitimate uses of the ocean. In addition, the material has been sufficiently described to make this determination.

2) The material does not contain any of the constituents prohibited as other than trace contaminants listed in 40 CFR Section 227.6 including organohalogen compounds,

mercury and mercury compounds, cadmium and cadmium compounds, oil, or known carcinogens, mutagens, or teratogens.

3) The material to be disposed in the ODMDS is composed of naturally occurring sediment to be dredged from waters of the U.S. and does not meet the definition of waste materials listed in 40 CFR Section 227.7.

4) The material does not contain toxic waste as regulated under 40 CFR Section 227.8.

5) Although large quantities of dredged material are proposed for placement at the ODMDS, the site was designated with these quantities in mind and was located in an area and sized such that unacceptable impacts would not occur as described in 40 CFR Section 227.9.

6) The designation of the ODMDS will take into account possible hazards to fishing, navigation, shorelines, and beaches. The material proposed for disposal at the ODMDS will be placed in such a manner as to not result in adverse impacts to the listed resources and as not to interfere with coastal navigation as described in 40 CFR Section 227.10.

7) The material proposed for placement at the ODMDS is not required to be containerized as described in 40 CFR Section 227.11.

8) The dredged material does not contain any inert synthetic or natural material that may float or remain in suspension. Dredged material is natural sediment dredged from the waterways of the U.S. and is not considered to be solid waste as described in 40 CFR Section 227.12.

9) The materials dredged from the project area were not considered to meet the exclusion criteria. Appropriate testing has been performed and is described in earlier sections of this Section 103 Evaluation. The material has been determined to be in compliance with the requirements of 40 CFR Section 227.6 and there would be no violation of marine water quality criteria after the allowance for mixing. Bioassays on the suspended particulate phase (elutriate) and solid phase (whole sediment bioassay) show that the material can be discharged so not to exceed the LPC as described in paragraph (b) of 40 CFR Section 227.27.

b. Compliance with 40 CFR Part 227 Subpart C – Need for Ocean Disposal. The need for ocean disposal for the maintenance sediments form the Pascagoula Lower Sound and Bayou Casotte Channels was documented in the *Final Environmental Impact Statement for the Designation of an Ocean Dredged Material Disposal Site Located Offshore Pascagoula, Mississippi* filed with the USEPA in July 1991, and the updates provided in the *Final Supplemental Environmental Impact Statement (FSEIS) for the Pascagoula Harbor Navigation Channel* (USACE 2010).

Based on the physical, chemical, and ecotoxicological testing condicted in the proposed widening areas, the sediments from the Pascagoula Improvements Project are physically and chemically similar to the maintenance material dredged from the channels, and the sediments meet the LPC for placement at the Pascagoula ODMDS. Placement of the dredged material from the proposed widening areas in the Pascagoula Lower Sound and Bayou Casotte Channel at the Pascagoula ODMDS will be further evaluated in the draft EIS for the Pascagoula Improvements project is, which is currently in progress (Notice of Intent, February 4, 2010).

The land use surrounding the project area consists primarily of commercial properties and industrial sites. These sites are heavily developed and present no viable temporary or permanent disposal options. Additionally the adjacent properties are not Federally owned or controlled. The only option identified to be feasible was the disposal of the material in the Pascagoula ODMDS. Furthermore, the southern reach of the Upper Sound Channel and the entire Lower Sound Channel are located sufficiently offshore and in close proximity to the Pascagoula ODMDS. Following the guidance in the *OTM* (USEPA/USACE 1991), Tier II and Tier III testing was completed by examining sediment, water column, and tissue chemistry.

c. Compliance with 40 CFR Part 227 Subpart D – Impact of the Proposed Dumping on Aesthetic, Recreational, and Economic Values. The following factors have been considered in making the determination that the proposed placement will not impact aesthetic, recreational or economic values of the Gulf in the vicinity of the ODMDS:

1) The area has been used in the past for the placement of dredged material and has not resulted in negative impacts to potential recreational or commercial activities.

2) Based on past use of the area and the characteristics of the material proposed for placement, no impact to water quality is to be expected. The material will be discharged from bottom dump scows with the initial point of discharge approximately 25 ft below the surface of the water. Based on results of the STFATE model, no applicable water quality standards will be violated by the proposed activity.

3) While the material proposed for placement contains substantial quantities of silt and clay, the point of initial discharge is below the surface of the water and the majority of the material will be entrained into the disposal plume, which is in a downward direction due to gravity. Studies indicate that any turbidity caused by placement is restricted to the immediate vicinity of the dump scow and will persist for only a short period of time.

4) Pathogenic organisms are not expected to be present in the material. However, if present they would likely be fecal coliforms that are killed by saline waters and would not pose any impact to fisheries. No shellfisheries are located in the vicinity of the ODMDS.

5) No toxic chemical constituents are present in the dredged material in concentrations suspected of affecting humans either directly or indirectly through the food chain. There are no constituents in the dredged material that would impact living marine resources of any recreational or commercial value.

d. Compliance with 40 CFR Part 227 Subpart E – Impact of the Proposed Dumping on Other Uses of the Ocean. The proposed placement of dredged material in the ODMDS would have no long term impact on any other uses of the ocean including, but not limited to, commercial and recreational fishing, commercial and recreational navigation, mineral exploration or development, or scientific research. Short-term impacts may occur because of the presence of the tugs and scows in the ODMDS, however this is extremely short term and all uses of the ocean with the exception of mineral exploration or development would continue to use the area between placement events. No mineral exploration or development has been permitted for this area so no impacts would result to this use. No irreversible or irretrievable commitment of resources would result from the proposed discharge.

7. MPRSA SECTION 103 CONDITIONS

a. Requirements to Meet Ocean Disposal Criteria. No special requirements are required to meet the ocean disposal criteria. Future placement of material at the ODMDS will undergo the same requirements as per USACE/USEPA guidelines for ocean placement (USACE/USEPA 1991; USEPA 2000). Future testing will be performed as specified by USEPA-Region 4.

b. Requirements of Site Designation Conditions. Placement shall occur no less than 330 feet (100 meters) inside the site boundaries such that the material, and placement methods shall prevent mounding from becoming an unacceptable navigation hazard to comply with 40 CFR Section 227.28. The actual location of placement within the Pascagoula ODMDS will be determined in coordination with USEPA Region 4 and USACE-Mobile District prior to the start of dredging.

Since currents tend to be predominantly west-southwest or west-northwest in the Pascagoula ODMDS, initial disposal of fine material will be made in the easternmost portions of the selected site, to the extent practical, to ensure that material does not migrate offsite. When possible, consideration shall be made to dispose of fine-grained material in the southernmost portion of the site and to dispose of coarse-grained material in the northern portion of the Pascagoula ODMDS to maintain consistency with the existing bottom substrate (USEPA/USACE 2006).

c. Requirements of the Site Monitoring and Management Plan (SMMP). The SMMP (USEPA/USACE 2006) requires that monitoring and precautions be taken to protect sea turtles and Gulf sturgeon between April 1 and November 30 when using hopper dredges. Monitoring according to the *Regional Biological Opinion for Dredging of Gulf of Mexico Navigation Channels and Sand Mining ("Borrow") Area Using Hopper Dredged by Corps Galveston, New Orleans, Mobile, and Jacksonville Districts* (NMF 2003) and standard surveillance and evasive measures to protect sea turtle and marine mammals shall be employed during all disposal operations at the ODMDS (USEPA/USACE 2006).

USACE will notify USEPA 15 days prior to the beginning of dredged material placement at the Pascagoula ODMDS, and USACE is required to provide a placement summary report to USEPA within 90 days after project completion that includes dates of placement, volume of dredged material, approximate location of placement, and post-placement bathymetric surveys. The USACE or its contractors will be required to prepare and submit daily reports of operations and a monthly report of operations for each month or partial month's work. Disposal monitoring reporting shall comply with the minimum requirements as specified in the Silent Inspector or equivalent system as approved by USEPA and USACE.

The USACE or its contractors will also perform after placement detailed bathymetric surveys of the designated ODMDS placement within 30 days of placement project completion. The number and lengths of the transects required will be sufficient to encompass the entire area of the ODMDS that was utilized, plus a 500-ft wide area around the area. Additional bathymetric surveys would be performed as necessary should concerns be raised concerning the placement location and even distribution of dredged material.

8. REFERENCES

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TABLE 1A. PHYSICAL CHARACTERISTICS OF SEDIMENT

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

ANALYTE	UNITS	Reference Site (Location B)	BAYOU CASOTTE CHANNEL BCW-01	BCW-02	BCW-03	BCW-04	BCW-05	BCW-06
GRAVEL	%	0	0	0	0	0	0	0
SAND	%	12	28.4	2.5	29.8	16.8	5	6.7
SILT	%	53	45	46.5	37.1	54.6	44.7	46.5
CLAY	%	35.1	26.7	51	33.1	28.6	50.3	46.8
SILT+CLAY	%	88.1	71.7	97.5	70.2	83.2	95	93.3
SPECIFIC GRAVITY	--	2.70	2.69	2.70	2.71	2.7	2.71	2.71
PERCENT SOLIDS	%	48.5	48.8	33.2	44.2	39.3	32.5	36.2

TABLE 1B. PHYSICAL CHARACTERISTICS OF SEDIMENT

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

ANALYTE	UNITS	Reference Site (Location B)	Reference Site (Location D)	PASCAGOULA LOWER SOUND								
				PLS-01	PLS-02	PLS-01/02	PLS-03	PLS-04	PLS-03/04	PLS-05*	PLS-06*	PLS-05/06*
GRAVEL	%	0	0	0	0	0	0	0	0	0	0	0
SAND	%	12	74.8	14.6	7.8	12.8	19.6	34.5	20.5	91.3	87.7	85.1
SILT	%	53	17.3	48.1	62.6	52	39.4	23.3	42.2	3.5	3.5	4.4
CLAY	%	35.1	7.8	37.3	29.6	35.2	41	42.2	37.3	5.2	8.9	10.6
SILT+CLAY	%	88.1	25.1	85.4	92.2	87.2	80.4	65.5	79.5	8.7	12.4	15
SPECIFIC GRAVITY	--	2.70	2.66	--	--	2.70	--	--	2.71	--	--	2.68
PERCENT SOLIDS	%	48.5	74.6	--	--	64.9	--	--	46	--	--	76.6

* = Location was compared to Reference Site D.

TABLE 2. GENERAL CHEMISTRY CONCENTRATIONS (MG/KG) IN SEDIMENT

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

					BAYOU CASOTTE CHANNEL						PASCAGOULA LOWER SOUND		
ANALYTE	UNITS	Average MDL	Reference Site (Location B)	Reference Site (Location D)	BCW-01	BCW-02	BCW-03	BCW-04	BCW-05	BCW-06	PLS-01/02	PLS-03/04	PLS-05/06*
DISSOLVED CYANIDE	MG/KG	1.12	1 U	0.67 U	1 U	1.5 U	1.1 U	1.3 U	1.5 U	1.4 U	0.77 U	1.1 U	0.65 U
NITROGEN, AMMONIA	MG/KG	11.2	**42.7**	**17**	**60**	**110**	**110**	**94.7**	**89.7**	**125**	**75.3**	**97.8**	**7.6**
NITROGEN, NITRATE	MG/KG	4.64	5.2 G U	6.7 G U	2.6 G U	7.5 G U	2.8 G U	3.2 G U	7.7 G U	6.9 G U	1.9 G U	2.7 G U	1.6 G U
NITROGEN, NITRITE	MG/KG	4.64	5.2 G U	6.7 G U	2.6 G U	7.5 G U	2.8 G U	3.2 G U	7.7 G U	6.9 G U	1.9 G U	2.7 G U	1.6 G U
NITROGEN, TOTAL KJELDAHL	MG/KG	335	**1,280 J**	**607 J**	**1,560 J**	**2,720 J**	**2,110 J**	**1,580 J**	**13,900 J**	**2,890 J**	**1,350 J**	**2,890 J**	**480 J**
PHOSPHORUS, TOTAL	MG/KG	72.1	**200**	**107**	**202**	**460**	**282**	**294**	**374**	**429**	**148**	**266**	**34.9**
SULFIDE, TOTAL	MG/KG	67.0	**23.1 B**	**24.7 B**	**421**	**679**	**560**	**625**	**431**	**721**	**249**	**593**	**30.3 B**
TOTAL ORGANIC CARBON	%	0.355	**1.30**	**0.339**	**1**	**1.82**	**1.04**	**1.23**	**1.49**	**1.55**	**0.61**	**0.898**	**0.082**

There are no sediment quality guidelines for the general chemistry parameters

* = Location was compared to Reference Site D.

NOTES: Bold values represent detected concentrations.
MDL is reported for non-detected constituents.

MDL = average method detection limit

B (inorganic) = compound was detected, but below the reporting limit (value is estimated)

J (inorganic) = compound was detected in the laboratory method blank

U = compound was analyzed, but not detected

G = diluted due to matrix interference

TABLE 3. METAL CONCENTRATIONS (MG/KG) IN SEDIMENT

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

							BAYOU CASOTTE CHANNEL						PASCAGOULA LOWER SOUND		
ANALYTE	UNITS	Average MDL	TEL*	PEL*	Reference Site (Location B)	Reference Site (Location D)	BCW-01	BCW-02	BCW-03	BCW-04	BCW-05	BCW-06	PLS-01/02	PLS-03/04	PLS-05/06**
ALUMINUM	MG/KG	0.32	--	--	**11,200**	**4,150**	**11,300**	**18,900**	**11,400**	**14,500**	**17,100**	**20,200**	**7,970**	**13,400**	**1,460**
ANTIMONY	MG/KG	0.0029	--	--	**0.11 B**	**0.057 B**	**0.16 B J**	**0.14 B J**	**0.09 B J**	**0.098 B J**	**0.11 B J**	**0.12 B J**	**0.067 B J**	**0.17 B J**	**0.026 B J**
ARSENIC	MG/KG	0.020	7.24	41.6	**7.8**	**3.4**	**6.6**	**10.9**	**7.8**	**9.2**	**10.6**	**12**	**4.4**	**10.2**	**1.3**
BERYLLIUM	MG/KG	0.008	--	--	**0.79**	**0.25**	**0.74**	**1.1**	**0.74**	**0.95**	**1.2**	**1.3**	**0.45 E**	**0.97**	**0.13**
CADMIUM	MG/KG	0.0078	0.676	4.21	**0.18**	**0.039 B**	**0.18**	**0.24**	**0.14**	**0.21**	**0.25**	**0.28**	**0.1**	**0.18**	**0.023 B**
CHROMIUM	MG/KG	0.007	52.3	160	**16.9 J**	**7.2 J**	**18.4 J**	**30 J**	**20.5 J**	**24.3 J**	**28.5 J**	**32.8 J**	**14.3 J**	**22.9 J**	**3.9 J**
COBALT	MG/KG	0.0017	--	--	**6.6**	**2.3**	**5.1**	**7.3**	**5.8**	**6.3**	**7.3**	**8.3**	**2.9**	**6.5**	**0.99**
COPPER	MG/KG	0.037	18.7	108	**12.6**	**2.4**	**7.1**	**10.9**	**6.3**	**8.3**	**10.2**	**11.1**	**3.9**	**7**	**1.5**
IRON	MG/KG	0.39	--	--	**19,300**	**6,810**	**17,000 J**	**26,300 J**	**19,600 J**	**21,900 J**	**26,000 J**	**29,500 J**	**13,100 J**	**23,000 J**	**2,990 J**
LEAD	MG/KG	0.0042	30.2	112	**13.2**	**5.4**	**14.1**	**20.5**	**12.3**	**17.2**	**21**	**23.2**	**9.2**	**14.1**	**2**
MANGANESE	MG/KG	0.0116	--	--	**415**	**139**	**398**	**1,030**	**491**	**684**	**946**	**994**	**228**	**389**	**42.7**
MERCURY	MG/KG	0.0121	0.13	0.696	**0.042**	0.0073 U	**0.04**	**0.07**	**0.055**	**0.061**	**0.072**	**0.07**	**0.032**	**0.053**	0.0071 U
NICKEL	MG/KG	0.013	15.9	42.8	**12.9**	**3.6**	**8.1**	**12.7**	**8.9**	**10.5**	**12.3**	**14.1**	**4.7**	**10.2**	**1.6**
SELENIUM	MG/KG	0.056	--	--	**0.55**	**0.21 B**	**0.65**	**1**	**0.67**	**0.79**	**0.96**	**1.1**	**0.43**	**0.77**	**0.15 B**
SILVER	MG/KG	0.0043	0.73	1.77	**0.056 B**	**0.015 B**	**0.048 B**	**0.072 B**	**0.042 B**	**0.063 B**	**0.076 B**	**0.083 B**	**0.031 B**	**0.05 B**	**0.0083 B**
THALLIUM	MG/KG	0.0022	--	--	**0.19**	**0.099 J**	**0.16**	**0.22**	**0.14**	**0.17**	**0.22**	**0.24**	**0.095**	**0.18**	**0.03 B**
TIN	MG/KG	0.07	--	--	**0.66**	**0.29 B**	**0.93**	**1.1**	**0.63**	**0.85**	**1.1**	**1.1**	**0.46**	**0.93**	**0.11 B**
ZINC	MG/KG	0.072	124	271	**51.3**	**17.5**	**48.9**	**69.2**	**42.2**	**54.8**	**65.4**	**70.3**	**22**	**41.7**	**6.3**
SEM/AVS	--	--	--	--	0.223	0.604	0.172	0.057	0.075	0.055	0.101	0.092	0.055	0.033	0.115

**Source*: MacDonald et al. 1996. Ecotoxicology 5: 253-278.

** = Location was compared to Reference Site D.

NOTES: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.
MDL is reported for non-detected constituents.

MDL = average method detection limit

PEL = probable effects level

TEL = threshold effects level

B (inorganic) = compound was detected, but below the reporting limit (value is estimated)

J (inorganic) = compound was detected in the laboratory method blank

U = compound was analyzed, but not detected

E = matrix interference; the serial dilution was outside of the percent difference control limits.

TABLE 4. PAH CONCENTRATIONS (UG/KG) IN SEDIMENT

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

							BAYOU CASOTTE CHANNEL						PASCAGOULA LOWER SOUND		
ANALYTE	UNITS	Average MDL	TEL*	PEL*	Reference Site (Location B)	Reference Site (Location D)	BCW-01	BCW-02	BCW-03	BCW-04	BCW-05	BCW-06	PLS-01/02	PLS-03/04	PLS-05/06**
Low Molecular Weight (LMW) PAHs															
1-METHYLNAPHTHALENE	UG/KG	1.95	--	--	1.5 U	2.4 U	1.5 U	2.1 U	1.6 U	1.8 U	2.2 U	1.9 U	1.1 U	1.5 U	0.92 U
2-METHYLNAPHTHALENE	UG/KG	1.63	20.2	201	1.2 U	2 U	1.2 U	1.8 U	1.3 U	1.5 U	1.8 U	1.6 U	0.91 U	1.3 U	0.78 U
ACENAPHTHENE	UG/KG	1.76	6.71	88.9	1.3 U	2.1 U	1.3 U	1.9 U	1.4 U	1.6 U	2 U	1.8 U	0.98 U	1.4 U	0.83 U
ANTHRACENE	UG/KG	1.78	46.9	245	1.3 U	2.2 U	1.3 U	1.9 U	1.5 U	1.6 U	2 U	1.8 U	1 U	1.4 U	0.84 U
FLUORENE	UG/KG	2.39	21.2	144	1.8 U	2.9 U	1.8 U	2.6 U	2 U	2.2 U	2.7 U	2.4 U	1.3 U	1.9 U	1.1 U
NAPHTHALENE	UG/KG	1.57	34.6	391	1.2 U	1.9 U	1.2 U	1.7 U	1.3 U	1.4 U	1.8 U	1.6 U	0.88 U	1.2 U	0.74 U
PHENANTHRENE	UG/KG	2.91	86.7	544	2.2 U	3.6 U	2.2 U	3.1 U	2.4 U	2.6 U	**11 J**	**9.2 J**	**8.3 J**	**13 J**	1.4 U
TOTAL LMW PAHS (ND=0) [a]	UG/KG	--	--	--	0	0	0	0	0	0	**11**	**9.2**	**8.3**	**13**	0
TOTAL LMW PAHS (ND=1/2MDL) [a]	UG/KG	--	--	--	**5.25**	**8.55**	**5.25**	**7.55**	**5.75**	**6.35**	**17.3**	**14.8**	**11.4**	**17.4**	**3.31**
TOTAL LMW PAHS (ND=MDL) [a]	UG/KG	--	--	--	**10.5**	**17.1**	**10.5**	**15.1**	**11.5**	**12.7**	**23.5**	**20.3**	**14.5**	**21.7**	**6.61**
High Molecular Weight (HMW) PAHs															
BENZO(A)ANTHRACENE	UG/KG	2.29	74.8	693	1.7 U	2.8 U	1.7 U	2.5 U	1.9 U	2.1 U	2.6 U	**3.7 J**	1.3 U	1.8 U	1.1 U
BENZO(A)PYRENE	UG/KG	1.83	88.8	763	1.4 U	2.2 U	**4.2 J**	2 U	1.5 U	1.7 U	**6.7 J**	1.8 U	1 U	**5.1 J**	0.86 U
CHRYSENE	UG/KG	2.16	108	846	1.6 U	2.7 U	1.6 U	2.3 U	1.8 U	2 U	2.4 U	**8.2 J**	1.2 U	1.7 U	1 U
DIBENZO(A,H)ANTHRACENE	UG/KG	2.02	6.22	135	1.5 U	2.5 U	1.5 U	2.2 U	1.7 U	1.8 U	2.3 U	2 U	1.1 U	1.6 U	0.96 U
FLUORANTHENE	UG/KG	1.96	113	1,494	**1.8 J**	2.4 U	**6.1 J**	**6.1 J**	**7.1 J**	**7.3 J**	**10 J**	**6.7 J**	1.1 U	**5.9 J**	0.92 U
PYRENE	UG/KG	1.84	153	1,398	1.4 U	2.3 U	**4.9 J**	**4.9 J**	**5 J**	**5 J**	**6.4 J**	**6 J**	1 U	**3.8 J**	0.87 U
TOTAL HMW PAHS (ND=0) [b]	UG/KG	--	--	--	**1.8**	0	**15.2**	**11**	**12.1**	**12.3**	**23.1**	**24.6**	0	**14.8**	0
TOTAL HMW PAHS (ND=1/2MDL) [b]	UG/KG	--	--	--	**5.6**	**7.45**	**17.6**	**15.5**	**15.6**	**16.1**	**26.8**	**26.5**	**3.35**	**17.4**	**2.86**
TOTAL HMW PAHS (ND=MDL) [b]	UG/KG	--	--	--	**9.4**	**14.9**	**20**	**20**	**19**	**19.9**	**30.4**	**28.4**	**6.7**	**19.9**	**5.71**
Other PAHs															
ACENAPHTHYLENE	UG/KG	2.10	5.87	128	1.6 U	2.6 U	1.6 U	2.3 U	1.7 U	1.9 U	2.4 U	2.1 U	1.2 U	1.6 U	0.99 U
BENZO(B)FLUORANTHENE	UG/KG	2.87	--	--	2.1 U	3.5 U	2.1 U	3.1 U	2.4 U	**6.8 J**	**8.1 J**	2.9 U	1.6 U	2.3 U	1.4 U
BENZO(G,H,I)PERYLENE	UG/KG	1.81	--	--	1.4 U	2.2 U	1.4 U	2 U	1.5 U	1.7 U	2 U	1.8 U	1 U	**3.9 J**	0.86 U
BENZO(K)FLUORANTHENE	UG/KG	3.69	--	--	2.8 U	4.5 U	2.8 U	4 U	3 U	3.4 U	4.1 U	3.7 U	2.1 U	2.9 U	1.7 U
INDENO(1,2,3-CD)PYRENE	UG/KG	1.87	--	--	1.4 U	2.3 U	1.4 U	2 U	1.5 U	1.7 U	2.1 U	1.9 U	1 U	1.5 U	0.89 U
TOTAL PAHS (ND=0) [c]	UG/KG	--	1,684	16,770	**1.8**	0	**15.2**	**11**	**12.1**	**19.1**	**42.2**	**33.8**	**8.3**	**31.7**	0
TOTAL PAHS (ND=1/2MDL) [c]	UG/KG	--	1,684	16,770	**15.5**	**23.6**	**27.5**	**29.8**	**26.4**	**33.6**	**57.4**	**47.5**	**18.2**	**42.8**	**9.08**
TOTAL PAHS (ND=MDL) [c]	UG/KG	--	1,684	16,770	**29.2**	**47.1**	**39.8**	**48.5**	**40.6**	**48.1**	**72.6**	**61.1**	**28.1**	**53.8**	**18.2**

**Source*: MacDonald et al. 1996. Ecotoxicology 5: 253-278.

** = Location was compared to Reference Site D.

NOTES: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines. MDL is reported for non-detected constituents.

(a) Low molecular weight (LMW) PAHs (NOAA 1989)

(b) High molecular weight (HMW) PAHs (NOAA 1989)

(c) Total PAHs is a sum of each individual PAH concentration, NOT the sum of the LMW and HMW PAHs

MDL = average method detection limit

PEL = probable effects level

TEL = threshold effects level

U = compound was analyzed, but not detected

J (organic) = compound was detected, but below the reporting limit (value is estimated)

TABLE 5. PCB CONGENER CONCENTRATIONS (UG/KG) IN SEDIMENT

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

ANALYTE	UNITS	Average MDL	TEL**	PEL**	Reference Site (Location B)	Reference Site (Location D)	BAYOU CASOTTE CHANNEL						PASCAGOULA LOWER SOUND		
							BCW-01	BCW-02	BCW-03	BCW-04	BCW-05	BCW-06	PLS-01/02	PLS-03/04	PLS-05/06***
PCB 8 (BZ) *	UG/KG	0.076	--	--	**0.46 PG**	**0.11 J PG**	**0.68 PG**	**1.3 PG**	**1.1 PG**	**0.23 J PG**	**0.56 PG**	**1.7 PG**	**0.32 PG**	**0.89 PG**	**0.34 PG**
PCB 18 (BZ) *	UG/KG	0.051	--	--	0.046 U	0.031 U	0.047 U	0.069 U	0.052 U	0.058 U	0.069 U	0.063 U	0.035 U	0.05 U	0.03 U
PCB 28 (BZ) *	UG/KG	0.082	--	--	0.076 U	0.05 U	0.077 U	0.11 U	0.085 U	0.095 U	0.11 U	**0.12 J PG**	0.058 U	**0.17 J PG**	0.049 U
PCB 44 (BZ) *	UG/KG	0.076	--	--	0.07 U	0.046 U	0.071 U	0.1 U	**0.18 J PG**	0.088 U	0.1 U	0.095 U	0.053 U	0.075 U	**0.14 J PG**
PCB 49 (BZ)	UG/KG	0.079	--	--	0.071 U	0.047 U	0.072 U	0.11 U	0.08 U	0.09 U	0.11 U	0.098 U	0.054 U	0.077 U	0.046 U
PCB 52 (BZ) *	UG/KG	0.074	--	--	0.067 U	0.045 U	0.068 U	0.1 U	0.075 U	0.085 U	0.1 U	0.092 U	0.051 U	0.072 U	0.043 U
PCB 66 (BZ) *	UG/KG	0.061	--	--	0.055 U	0.037 U	0.056 U	0.082 U	0.062 U	0.07 U	0.082 U	0.076 U	0.042 U	0.059 U	0.036 U
PCB 77 (BZ) *	UG/KG	0.081	--	--	0.074 U	0.049 U	0.075 U	0.11 U	0.083 U	0.093 U	0.11 U	0.1 U	0.056 U	0.079 U	0.048 U
PCB 87 (BZ)	UG/KG	0.069	--	--	0.063 U	0.042 U	0.064 U	0.094 U	0.071 U	0.079 U	0.094 U	0.086 U	0.048 U	0.068 U	0.041 U
PCB 90 (BZ)	UG/KG	0.057	--	--	0.052 U	0.034 U	0.052 U	0.077 U	0.058 U	0.065 U	0.077 U	0.071 U	0.039 U	0.056 U	0.033 U
PCB 101 (BZ) *	UG/KG	0.075	--	--	0.068 U	0.045 U	0.069 U	0.1 U	0.076 U	0.086 U	0.1 U	0.093 U	0.052 U	0.073 U	0.044 U
PCB 105 (BZ) *	UG/KG	0.078	--	--	0.071 U	0.047 U	0.072 U	0.11 U	0.079 U	0.089 U	0.11 U	0.097 U	0.054 U	0.076 U	0.046 U
PCB 118 (BZ) *	UG/KG	0.075	--	--	0.069 U	0.046 U	0.07 U	0.1 U	0.077 U	0.087 U	0.1 U	0.094 U	0.053 U	0.074 U	0.045 U
PCB 126 (BZ) *	UG/KG	0.097	--	--	0.089 U	0.059 U	0.09 U	0.13 U	0.099 U	0.11 U	0.13 U	0.12 U	0.068 U	0.095 U	0.057 U
PCB 128 (BZ) *	UG/KG	0.076	--	--	0.069 U	0.046 U	0.07 U	0.1 U	**0.18 J**	0.087 U	0.1 U	0.095 U	0.053 U	**0.16 J**	**0.13 J**
PCB 138 (BZ) *	UG/KG	0.080	--	--	0.073 U	0.048 U	**0.19 J PG**	0.11 U	**0.28 J PG**	0.091 U	**0.23 J PG**	0.099 U	0.055 U	**0.23 J PG**	**0.17 J PG**
PCB 153 (BZ) *	UG/KG	0.076	--	--	0.07 U	0.047 U	**0.33 J**	**0.41 J**	**0.41**	0.088 U	**0.36 J**	**0.31 J**	**0.18 J**	**0.38**	**0.24 PG**
PCB 156 (BZ)	UG/KG	0.075	--	--	0.069 U	0.045 U	0.07 U	0.1 U	0.077 U	0.086 U	0.1 U	0.094 U	0.052 U	0.074 U	0.044 U
PCB 169 (BZ) *	UG/KG	0.073	--	--	0.067 U	0.044 U	0.067 U	0.099 U	0.075 U	0.084 U	0.099 U	0.091 U	0.051 U	0.072 U	0.043 U
PCB 170 (BZ) *	UG/KG	0.076	--	--	0.07 U	0.046 U	**0.21 J**	**0.25 J**	**0.14 J PG**	0.087 U	**0.15 J PG**	**0.19 J**	**0.12 J**	**0.17 J PG**	**0.13 J PG**
PCB 180 (BZ) *	UG/KG	0.075	--	--	0.069 U	0.046 U	**0.23 J**	**0.28 J**	**0.32 J**	**0.12 J PG**	**0.26 J**	**0.22 J**	**0.13 J**	**0.27 J**	**0.21 J**
PCB 183 (BZ)	UG/KG	0.074	--	--	0.067 U	0.045 U	0.068 U	0.1 U	0.075 U	0.085 U	0.1 U	0.092 U	0.051 U	0.072 U	0.043 U
PCB 184 (BZ)	UG/KG	0.064	--	--	0.058 U	0.039 U	0.059 U	0.087 U	0.065 U	0.073 U	0.087 U	0.08 U	0.044 U	0.063 U	0.038 U
PCB 187 (BZ) *	UG/KG	0.079	--	--	0.072 U	0.047 U	0.073 U	0.11 U	0.08 U	0.09 U	0.11 U	0.098 U	0.055 U	0.077 U	0.046 U
PCB 195 (BZ)	UG/KG	0.075	--	--	0.068 U	0.045 U	0.069 U	0.1 U	0.077 U	0.086 U	0.1 U	0.094 U	0.052 U	0.074 U	0.044 U
PCB 206 (BZ)	UG/KG	0.074	--	--	0.068 U	0.045 U	0.069 U	0.1 U	0.076 U	0.085 U	0.1 U	0.093 U	0.052 U	0.073 U	0.044 U
PCB 209 (BZ)	UG/KG	0.080	--	--	0.073 U	0.048 U	0.074 U	0.11 U	**0.24 J**	0.091 U	0.11 U	0.099 U	0.055 U	0.078 U	0.047 U
Total USEPA-Region 4 PCBs (ND=0)	UG/KG	--	21.6	189	**0.92**	**0.22**	**3.28**	**4.48**	**5.22**	**0.7**	**3.12**	**5.08**	**1.5**	**4.54**	**2.72**
Total USEPA-Region 4 PCBs (ND=1/2MDL)	UG/KG	--	21.6	189	**2.10**	**0.999**	**4.19**	**5.91**	**6.06**	**2.09**	**4.44**	**6.29**	**2.24**	**5.34**	**3.21**
Total USEPA-Region 4 PCBs (ND=MDL)	UG/KG	--	21.6	189	**3.27**	**1.78**	**5.09**	**7.34**	**6.91**	**3.48**	**5.76**	**7.51**	**2.97**	**6.14**	**3.69**

* PCB congeners used for Total PCB summation, as per Table 9-3 of the ITM (USEPA/USACE 1998)

***Source* : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

*** = Location was compared to Reference Site D.

NOTES: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines. MDL is reported for non-detected constituents.

MDL = average method detection limit

PEL = probable effects level

TEL = threshold effects level

J (organic) = compound was detected, but below the reporting limit (value is estimated)

PG = the percent difference between the original and confirmation analysis is greater than 40%

U = compound was analyzed, but not detected

TABLE 6. CHLORINATED PESTICIDE CONCENTRATIONS (UG/KG) IN SEDIMENT

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

							BAYOU CASOTTE CHANNEL						PASCAGOULA LOWER SOUND		
ANALYTE	UNITS	Average MDL	TEL*	PEL*	Reference Site (Location B)	Reference Site (Location D)	BCW-01	BCW-02	BCW-03	BCW-04	BCW-05	BCW-06	PLS-01/02	PLS-03/04	PLS-05/06***
2,4'-DDD	UG/KG	0.014	--	--	0.01 U	0.0067 U	0.01 U	0.015 U	0.022 U	0.013 U	0.015 U	0.014 U	0.0077 U	0.011 U	0.0065 U
4,4'-DDD	UG/KG	0.030	1.22	7.81	**0.029 B PG**	**0.083 J**	0.022 U	0.033 U	0.049 U	0.027 U	0.033 U	0.03 U	0.017 U	0.024 U	0.014 U
2,4'-DDE	UG/KG	0.021	--	--	0.016 U	0.01 U	0.016 U	0.023 U	0.034 U	0.019 U	0.023 U	**0.067 J PG**	0.012 U	**0.12 J PG**	0.0099 U
4,4'-DDE	UG/KG	0.035	2.07	374	**0.093 J**	**0.11**	**0.083 J**	**0.22 J**	**0.14 J**	**0.17 J**	**0.13 J PG**	**0.21 J**	**0.05 J**	**0.25**	0.016 U
2,4'-DDT	UG/KG	0.020	--	--	0.015 U	0.0097 U	0.015 U	0.022 U	0.032 U	0.018 U	0.022 U	0.02 U	0.011 U	0.016 U	0.0093 U
4,4'-DDT	UG/KG	0.035	1.19	4.77	0.026 U	0.017 U	0.026 U	**0.09 J**	**0.1 J**	**0.071 J PG**	**0.5**	**0.1 J PG**	**0.036 J PG**	**0.07 J PG**	0.016 U
ALDRIN	UG/KG	0.041	--	--	**0.035 J PG**	0.02 U	0.031 U	0.045 U	0.066 U	0.038 U	0.045 U	0.041 U	0.023 U	0.032 U	0.019 U
ALPHA-BHC	UG/KG	0.038	--	--	0.028 U	0.018 U	0.028 U	0.041 U	0.061 U	0.034 U	0.041 U	0.038 U	0.021 U	0.03 U	0.018 U
BETA-BHC	UG/KG	0.060	--	--	0.044 U	0.029 U	0.044 U	0.065 U	0.096 U	0.054 U	0.066 U	0.06 U	0.033 U	0.047 U	0.028 U
CHLORBENSIDE	UG/KG	0.119	--	--	0.089 U	0.058 U	0.089 U	0.13 U	0.19 U	0.11 U	0.13 U	0.12 U	0.067 U	0.095 U	0.056 U
CHLORDANE	UG/KG	0.1	2.26	4.79	0.075 U	0.049 U	0.075 U	0.11 U	0.16 U	0.092 U	0.11 U	0.1 U	0.057 U	0.08 U	0.047 U
DACTHAL	UG/KG	0.035	--	--	**0.15 B PG**	0.017 U	0.026 U	**0.079 J PG**	0.057 U	**0.062 J PG**	0.039 U	**0.082 J PG**	**0.05 J**	**0.066 J PG**	**0.026 J**
DELTA-BHC	UG/KG	0.035	--	--	0.026 U	**0.065 J PG**	0.026 U	**0.047 J PG**	0.057 U	0.032 U	0.039 U	0.035 U	0.02 U	0.028 U	0.017 U
DIELDRIN	UG/KG	0.038	0.72	4.3	0.028 U	0.019 U	0.028 U	0.042 U	0.062 U	0.035 U	**0.067 J PG**	0.038 U	0.021 U	0.03 U	0.018 U
ENDOSULFAN SULFATE	UG/KG	0.024	--	--	**0.021 B PG**	0.012 U	0.018 U	**0.04 J PG**	0.039 U	0.022 U	0.027 U	**0.05 J PG**	0.013 U	0.019 U	0.011 U
ENDOSULFAN-I	UG/KG	0.043	--	--	0.032 U	**0.037 J PG**	0.032 U	0.047 U	0.07 U	0.04 U	0.048 U	0.043 U	0.024 U	0.034 U	0.02 U
ENDOSULFAN-II	UG/KG	0.041	--	--	0.03 U	**0.079 J PG**	0.03 U	0.044 U	0.066 U	0.037 U	0.045 U	0.041 U	0.023 U	0.032 U	0.019 U
ENDRIN	UG/KG	0.045	--	--	**0.073 J**	**0.14**	**0.036 J PG**	0.049 U	0.072 U	0.041 U	0.049 U	0.045 U	0.025 U	0.035 U	0.021 U
ENDRIN ALDEHYDE	UG/KG	0.045	--	--	0.033 U	0.022 U	0.033 U	0.049 U	0.072 U	0.041 U	0.049 U	0.045 U	0.025 U	0.035 U	0.021 U
GAMMA-BHC (LINDANE)	UG/KG	0.040	0.32	0.99	**0.092 B PG**	**0.062 B PG**	**0.11 J PG**	**0.29**	**0.21 J PG**	**0.14 J PG**	**0.17 J PG**	**0.31 PG**	**0.077 J PG**	**0.22**	**0.054 J PG**
HEPTACHLOR	UG/KG	0.051	--	--	**0.14 J PG**	**0.099 J PG**	0.038 U	**0.1 J PG**	0.083 U	**0.067 J PG**	0.056 U	**0.079 J PG**	**0.043 J PG**	**0.065 J PG**	**0.026 J PG**
HEPTACHLOR EPOXIDE	UG/KG	0.045	--	2.74**	0.033 U	**0.038 J PG**	0.033 U	0.049 U	0.072 U	0.041 U	0.049 U	0.045 U	0.025 U	0.035 U	0.021 U
METHOXYCHLOR	UG/KG	0.048	--	--	**0.2 J**	0.023 U	**0.22 J PG**	0.052 U	**0.38 J PG**	0.044 U	0.053 U	**0.13 J PG**	**0.11 J**	**0.41**	0.022 U
MIREX	UG/KG	0.021	--	--	0.016 U	0.01 U	0.016 U	0.023 U	0.034 U	0.019 U	0.023 U	0.021 U	0.012 U	0.017 U	0.0099 U
TOXAPHENE	UG/KG	1.5	--	--	1.1 U	0.75 U	1.1 U	1.7 U	2.5 U	1.4 U	1.7 U	1.5 U	0.86 U	1.2 U	0.72 U

Source: MacDonald et al. 1996. Ecotoxicology 5: 253-278.

***Source*: CCME 2001. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life.

*** = Location was compared to Reference Site D.

NOTES: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.
MDL is reported for non-detected constituents.

MDL = average method detection limit

PEL = probable effects level

TEL = threshold effects level

B (organic) = compound was detected in the laboratory method blank

J (organic) = compound was detected, but below the reporting limit (value is estimated)

PG = the percent difference between the original and confirmation analysis is greater than 40%

U = compound was analyzed, but not detected

TABLE 7. DIOXIN AND FURAN CONGENER CONCENTRATIONS (NG/KG) IN SEDIMENT

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

ANALYTE	UNITS	Average RL	TEF*	Reference Site (Location B)	Reference Site (Location D)	BAYOU CASOTTE CHANNEL						PASCAGOULA LOWER SOUND		
						BCW-01	BCW-02	BCW-03	BCW-04	BCW-05	BCW-06	PLS-01/02	PLS-03/04	PLS-05/06**
2,3,7,8-TCDD	NG/KG	0.71	1	0.49 U	0.56 U	0.61 U	0.67 U	0.57 U	0.64 U	1 U	0.82 U	0.72 U	**4.2**	**2.6**
1,2,3,7,8-PECDD	NG/KG	0.37	1	**0.95 J**	0.29 U	**1.3 Q J**	0.37 U	0.3 U	**2.5 J**	**3 J**	**3.3 J**	**1.3 J**	0.35 U	0.3 U
1,2,3,4,7,8-HXCDD	NG/KG	0.30	0.1	**2 J**	0.22 U	**3.2 Q J**	**0.25 Q J**	0.18 U	**5.8 J**	**7 J**	**7.8**	**4.4 J**	**0.75 Q J**	**0.39 J**
1,2,3,6,7,8-HXCDD	NG/KG	0.40	0.1	**4.5 Q J**	**0.71 Q J**	**7.6**	**1 Q J**	0.25 U	**14**	**19**	**19**	**19**	**2.8 J**	**0.63 J**
1,2,3,7,8,9-HXCDD	NG/KG	0.32	0.1	**12 C**	**1.9 Q J**	**24 C**	**2.8 C J**	**0.45 Q J**	**41 C**	**51 C**	**52 C**	**61 C**	**7 C**	**2 Q J**
1,2,3,4,6,7,8-HPCDD	NG/KG	0.64	0.01	**170**	**33**	**320**	**43**	**7.5**	**550**	**680**	**660**	**1,200**	**100**	**29**
OCDD	NG/KG	0.8	0.0003	**3,500**	**740**	**6,400 E**	**860**	**150**	**12,000 E**	**15,000 E**	**12,000 E**	**26,000 E**	**2,100**	**470**
2,3,7,8-TCDF	NG/KG	0.34	0.1	**0.49 J**	0.39 U	**1.6 Q**	0.46 U	0.35 U	**2.4**	**2.7**	**3.4 Q**	**0.52 Q J**	**0.55 Q J**	0.39 U
1,2,3,7,8-PECDF	NG/KG	0.27	0.03	0.17 U	0.23 U	0.23 U	0.3 U	0.23 U	**0.37 Q J**	**0.48 Q J**	**0.55 Q J**	0.24 U	0.25 U	0.23 U
2,3,4,7,8-PECDF	NG/KG	0.23	0.3	0.14 U	0.19 U	0.21 U	0.25 U	0.19 U	**0.43 Q J**	0.3 U	**0.4 Q J**	0.21 U	0.2 U	0.18 U
1,2,3,4,7,8-HXCDF	NG/KG	0.19	0.1	**0.22 Q J**	0.14 U	**0.71 J**	0.22 U	0.14 U	**1.3 J**	**0.75 Q J**	**1.4 Q J**	0.18 U	0.16 U	0.14 U
1,2,3,6,7,8-HXCDF	NG/KG	0.18	0.1	**0.19 Q J**	0.14 U	**0.31 J**	0.22 U	0.13 U	**0.83 J**	**1.1 J**	**1.2 J**	**0.64 J**	0.16 U	0.14 U
2,3,4,6,7,8-HXCDF	NG/KG	0.19	0.1	**0.19 Q J**	0.15 U	0.25 U	0.25 U	0.14 U	**0.59 J**	**0.82 J**	**0.54 Q J**	0.18 U	0.17 U	0.14 U
1,2,3,7,8,9-HXCDF	NG/KG	0.29	0.1	0.14 U	0.21 U	0.33 U	0.36 U	0.22 U	0.24 U	0.38 U	0.31 U	0.31 U	0.28 U	0.21 U
1,2,3,4,6,7,8-HPCDF	NG/KG	0.31	0.01	**3.6 J**	**0.89 J**	**6.3**	**1.1 J**	0.23 U	**10**	**13**	**12**	**2.6 J**	**1.5 J**	0.24 U
1,2,3,4,7,8,9-HPCDF	NG/KG	0.81	0.01	0.22 U	0.51 U	0.66 U	0.77 U	0.6 U	0.57 U	1.1 U	0.65 U	1.1 U	0.87 U	0.51 U
OCDF	NG/KG	0.5	0.0003	**3.6 J**	0.48 U	**2.2 J**	0.5 U	0.41 U	**2.9 J**	**3.3 J**	**5.1 J**	0.47 U	0.56 U	0.4 U
DIOXIN TEQ (ND=0)	NG/KG	--	--	**5.19**	**0.561**	**8.45**	**0.979**	**0.12**	**18.3**	**22.6**	**21.6**	**29.6**	**6.83**	**3.13**
DIOXIN TEQ (ND=1/2RL)	NG/KG	--	--	**5.46**	**1.08**	**8.82**	**1.62**	**0.662**	**18.6**	**23.2**	**22.1**	**30.1**	**7.08**	**3.37**
DIOXIN TEQ (ND=RL)	NG/KG	--	--	**5.74**	**1.61**	**9.19**	**2.26**	**1.20**	**19.0**	**23.7**	**22.5**	**30.5**	**7.33**	**3.60**

**Source* : The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds. *Toxicological Sciences* 2006 93(2):223-241

** = Location was compared to Reference Site D.

There are no sediment quality guidelines for dioxins and furans.

J = compound was detected, but below the reporting limit (value is estimated)

Q = estimated maximum possible concentration

U = compound was analyzed, but not detected

E = The amount reported is above the upper calibration limit in the method, therefore the reported result is an estimate

C = "Coeluting Isomer" – The isomer is known to coelute with another member of its homologue group, or the peak shape is shouldered, indicating the likelihood of a coeluting isomer.

NOTES: Bold values represent detected concentrations.
RL is reported for non-detected constituents.

RL = average reporting limit

TEF = toxicity equivalency factor

TEQ = toxicity equivalency quotient

TABLE 8. SEMIVOLATILE ORGANIC COMPOUND (SVOC) CONCENTRATIONS (UG/KG) IN SEDIMENT

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

							BAYOU CASOTTE CHANNEL						PASCAGOULA LOWER SOUND		
ANALYTE	UNITS	Average MDL	TEL*	PEL*	Reference Site (Location B)	Reference Site (Location D)	BCW-01	BCW-02	BCW-03	BCW-04	BCW-05	BCW-06	PLS-01/02	PLS-03/04	PLS-05/06**
1,2,4-TRICHLOROBENZENE	UG/KG	5.03	--	--	3.8 U	6.2 U	3.8 U	5.4 U	4.1 U	4.6 U	5.7 U	5 U	2.8 U	4 U	2.4 U
1,2-DICHLOROBENZENE	UG/KG	9.55	--	--	7.1 U	12 U	7.2 U	10 U	7.8 U	8.7 U	11 U	9.6 U	5.3 U	7.5 U	4.5 U
1,2-DIPHENYLHYDRAZINE	UG/KG	11.7	--	--	8.7 U	14 U	8.8 U	13 U	9.6 U	11 U	13 U	12 U	6.5 U	9.2 U	5.5 U
1,3-DICHLOROBENZENE	UG/KG	7.11	--	--	5.3 U	8.7 U	5.3 U	7.7 U	5.8 U	6.5 U	8 U	7.1 U	4 U	5.6 U	3.4 U
1,4-DICHLOROBENZENE	UG/KG	6.49	--	--	4.9 U	8 U	4.9 U	7 U	5.4 U	5.9 U	7.3 U	6.5 U	3.6 U	5.1 U	3.1 U
2,4,6-TRICHLOROPHENOL	UG/KG	13.6	--	--	10 U	17 U	10 U	15 U	11 U	12 U	15 U	14 U	7.6 U	11 U	6.5 U
2,4-DICHLOROPHENOL	UG/KG	1.83	--	--	1.4 U	2.2 U	1.4 U	2 U	1.5 U	1.7 U	2.1 U	1.8 U	1 U	1.4 U	0.86 U
2,4-DIMETHYLPHENOL	UG/KG	14.2	--	--	11 U	17 U	11 U	15 U	12 U	13 U	16 U	14 U	8 U	11 U	6.7 U
2,4-DINITROPHENOL	UG/KG	108	--	--	81 U	130 U	81 U	120 U	89 U	99 U	120 U	110 U	61 U	85 U	51 U
2,4-DINITROTOLUENE	UG/KG	7.36	--	--	5.5 U	9 U	5.5 U	7.9 U	6 U	6.7 U	8.3 U	7.4 U	4.1 U	5.8 U	3.5 U
2,6-DINITROTOLUENE	UG/KG	9.41	--	--	7 U	12 U	7.1 U	10 U	7.7 U	8.6 U	11 U	9.4 U	5.2 U	7.4 U	4.4 U
2-CHLORONAPHTHALENE	UG/KG	1.90	--	--	1.4 U	2.3 U	1.4 U	2.1 U	1.6 U	1.7 U	2.1 U	1.9 U	1.1 U	1.5 U	0.9 U
2-CHLOROPHENOL	UG/KG	7.43	--	--	5.6 U	9.1 U	5.6 U	8 U	6.1 U	6.8 U	8.4 U	7.5 U	4.2 U	5.9 U	3.5 U
2-METHYLPHENOL	UG/KG	6.39	--	--	4.8 U	7.8 U	4.8 U	6.9 U	5.2 U	5.8 U	7.2 U	6.4 U	3.6 U	5 U	3 U
2-NITROPHENOL	UG/KG	10.1	--	--	7.5 U	12 U	7.5 U	11 U	8.2 U	9.2 U	11 U	10 U	5.6 U	7.9 U	4.8 U
3,3'-DICHLOROBENZIDINE	UG/KG	9.67	--	--	7.2 U	12 U	7.2 U	10 U	7.9 U	8.8 U	11 U	9.6 U	5.4 U	7.6 U	4.6 U
4,6-DINITRO-O-CRESOL	UG/KG	36.5	--	--	27 U	45 U	27 U	40 U	30 U	33 U	41 U	37 U	20 U	29 U	17 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	7.89	--	--	5.9 U	9.7 U	5.9 U	8.6 U	6.5 U	7.2 U	8.9 U	7.9 U	4.4 U	6.2 U	3.8 U
4-CHLORO-3-METHYL PHENOL	UG/KG	8.36	--	--	6.3 U	10 U	6.3 U	9.1 U	6.9 U	7.7 U	9.4 U	8.4 U	4.7 U	6.6 U	4 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	10.1	--	--	7.6 U	12 U	7.6 U	11 U	8.3 U	9.2 U	11 U	10 U	5.7 U	8 U	4.8 U
4-METHYLPHENOL	UG/KG	8.88	--	--	6.7 U	11 U	6.7 U	9.6 U	7.3 U	8.1 U	10 U	8.9 U	5 U	7 U	4.2 U
4-NITROPHENOL	UG/KG	31.1	--	--	23 U	38 U	23 U	34 U	26 U	28 U	35 U	31 U	17 U	24 U	15 U
BENZIDINE	UG/KG	382	--	--	290 U	470 U	290 U	410 U	310 U	350 U	430 U	380 U	210 U	300 U	180 U
BENZOIC ACID	UG/KG	37.8	--	--	28 U	46 U	28 U	41 U	31 U	34 U	43 U	38 U	21 U	30 U	18 U
BENZYL ALCOHOL	UG/KG	11.1	--	--	8.2 U	14 U	8.3 U	12 U	9 U	10 U	12 U	11 U	6.2 U	8.7 U	5.2 U
BIS(2-CHLOROETHOXY)METHANE	UG/KG	5.98	--	--	4.5 U	7.4 U	4.5 U	6.5 U	4.9 U	5.5 U	6.8 U	6 U	3.3 U	4.7 U	2.8 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	2.44	--	--	1.8 U	3 U	1.8 U	2.6 U	2 U	2.2 U	2.8 U	2.5 U	1.4 U	1.9 U	1.2 U
BIS(2-CHLOROISOPROPYL) ETHER	UG/KG	1.96	--	--	1.5 U	2.4 U	1.5 U	2.1 U	1.6 U	1.8 U	2.2 U	2 U	1.1 U	1.5 U	0.93 U
BIS(2-ETHYLHEXYL) PHTHALATE	UG/KG	14.7	182	2,647	11 U	18 U	**84**	**16 J**	**15 J**	**17 J**	**440**	**16 J**	**13 J**	**15 J**	**8.5 J**
BUTYL BENZYL PHTHALATE	UG/KG	12.3	--	--	9.3 U	15 U	**13 J**	**17 J**	**24 J**	**18 J**	**28 J**	**13 J**	**20 J**	**25 J**	**12 J**
DIBENZOFURAN	UG/KG	8.91	--	--	6.7 U	11 U	6.7 U	9.7 U	7.4 U	8.2 U	10 U	9 U	5 U	7.1 U	4.2 U
DIETHYL PHTHALATE	UG/KG	9.95	--	--	7.4 U	12 U	7.5 U	11 U	8.2 U	9.1 U	11 U	10 U	5.6 U	**17 J**	4.7 U
DIMETHYL PHTHALATE	UG/KG	9.87	--	--	7.4 U	12 U	7.4 U	11 U	8.2 U	9.1 U	11 U	9.9 U	5.5 U	7.8 U	4.7 U
DI-N-BUTYL PHTHALATE	UG/KG	11.4	--	--	8.5 U	14 U	8.6 U	12 U	**9.4 J**	10 U	13 U	11 U	**8.4 J**	**12 J**	5.4 U
DI-N-OCTYL PHTHALATE	UG/KG	9.65	--	--	7.2 U	12 U	7.2 U	10 U	7.9 U	8.8 U	11 U	9.6 U	5.4 U	7.6 U	4.5 U
HEXACHLOROBENZENE	UG/KG	1.95	--	--	1.5 U	2.4 U	1.5 U	2.1 U	1.6 U	1.8 U	2.2 U	1.9 U	1.1 U	1.5 U	0.92 U
HEXACHLOROBUTADIENE	UG/KG	2.03	--	--	1.5 U	2.5 U	1.5 U	2.2 U	1.7 U	1.9 U	2.3 U	2 U	1.1 U	1.6 U	0.96 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	9.81	--	--	7.3 U	12 U	7.4 U	11 U	8.1 U	9 U	11 U	9.8 U	5.5 U	7.7 U	4.6 U
HEXACHLOROETHANE	UG/KG	6.59	--	--	4.9 U	8 U	4.9 U	7.1 U	5.4 U	6 U	7.4 U	6.6 U	3.7 U	5.2 U	3.1 U
ISOPHORONE	UG/KG	6.86	--	--	5.1 U	8.4 U	5.2 U	7.4 U	5.6 U	6.3 U	7.7 U	6.9 U	3.8 U	5.4 U	3.2 U
NITROBENZENE	UG/KG	7.59	--	--	5.7 U	9.3 U	5.7 U	8.2 U	6.2 U	6.9 U	8.5 U	7.6 U	4.2 U	6 U	3.6 U
N-NITROSODIMETHYLAMINE	UG/KG	7.82	--	--	5.8 U	9.6 U	5.9 U	8.4 U	6.4 U	7.1 U	8.8 U	7.8 U	4.4 U	6.2 U	3.7 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	2.14	--	--	1.6 U	2.6 U	1.6 U	2.3 U	1.8 U	2 U	2.4 U	2.1 U	1.2 U	1.7 U	1 U
N-NITROSODIPHENYLAMINE	UG/KG	8.37	--	--	6.3 U	10 U	6.3 U	9.1 U	6.9 U	7.7 U	9.5 U	8.4 U	4.7 U	6.6 U	4 U
PENTACHLOROPHENOL	UG/KG	8.13	--	--	6.1 U	10 U	6.1 U	8.8 U	6.7 U	7.4 U	9.2 U	8.2 U	4.5 U	6.4 U	3.9 U
PHENOL	UG/KG	2.15	--	--	1.6 U	2.6 U	**50**	**43**	**87**	**32**	**16 J**	**26**	**60**	**97**	**5 J**

* *Source:* MacDonald et al. 1996. Ecotoxicology 5:253-278.

** = Location was compared to Reference Site D.

NOTES: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.
MDL is reported for non-detected constituents.

MDL = average method detection limit

J (organic) = compound was detected, but below the reporting limit (value is estimated)

U = compound was analyzed, but not detected

PEL = probable effects level

TEL = threshold effects level

TABLE 9. BUTYLTIN CONCENTRATIONS (UG/KG) IN SEDIMENT

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

					BAYOU CASOTTE CHANNEL						PASCAGOULA LOWER SOUND		
ANALYTE	UNITS	Average RL	Reference Site (Location B)	Reference Site (Location D)	BCW-01	BCW-02	BCW-03	BCW-04	BCW-05	BCW-06	PLS-01/02	PLS-03/04	PLS-05/06**
MONOBUTYLTIN*	UG/KG	1.2	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
DIBUTYLTIN*	UG/KG	0.32	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
TRIBUTYLTIN*	UG/KG	0.57	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
TETRABUTYLTIN	UG/KG	0.41	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
TOTAL BUTYLTINS (ND=RL)	UG/KG	--	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21

NOTES: Bold values represent detected concentrations.
RL is reported for non-detected constituents.

* = Butyltins used to calculate total organotins

** = Location was compared to Reference Site D.

RL = average reporting limit

U = compound was analyzed, but not detected

TABLE 10. GENERAL CHEMISTRY CONCENTRATIONS (MG/L) IN SITE WATER AND STANDARD ELUTRIATES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

			BAYOU CASOTTE CHANNEL									PASCAGOULA LOWER SOUND					
ANALYTE	UNITS	Average RL	USEPA ACUTE CRITERIA *	USEPA CHRONIC CRITERIA *	Site Water (BCW-WAT)	Elutriate BCW-01	Elutriate BCW-02	Elutriate BCW-03	Elutriate BCW-04	Elutriate BCW-05	Elutriate BCW-06	USEPA ACUTE CRITERIA *	USEPA CHRONIC CRITERIA *	Site Water (PLS-WAT)	Elutriate PLS-01/02	Elutriate PLS-03/04	Elutriate PLS-05/06
AMMONIA AS NITROGEN	MG/L	0.73	5.83 (a)	0.875 (a)	**0.33 J**	**25.2 J**	**11.4 J**	**13.3 J**	**13.5 J**	**9 J**	**18.1 J**	3.68 (b)	0.553 (b)	**0.3 J**	**20.5 J**	**12.9 J**	**0.79 J**
NITRATE AS N	MG/L	2.5	--	--	2.5 G U	2.5 G U	2.5 G U	2.5 G U	2.5 G U	2.5 G U	2.5 G U	--	--	2.5 G U	2.5 G U	2.5 G U	2.5 G U
NITRITE AS N	MG/L	2.5	--	--	2.5 G U	2.5 G U	2.5 G U	2.5 G U	2.5 G U	2.5 G U	2.5 G U	--	--	2.5 G U	2.5 G U	2.5 G U	2.5 G U
DISSOLVED CYANIDE	UG/L	10	1	1	10 U	10 U	10 U	10 U	**1.6 B**	10 U	10 U	1	1	10 U	10 U	10 U	10 U
TOTAL KJELDAHL NITROGEN	MG/L	3	--	--	**2.8 B J**	**41.9**	**14.1**	**28.8**	**17.0**	**11.3**	**20.9**	--	--	**2.8 B J**	**18.7 J**	**12.4 J**	3 U
TOTAL ORGANIC CARBON	MG/L	1	--	--	**0.56 B**	**2.8 J**	**5.1 J**	**2.8 J**	**3.6 J**	**4.7 J**	**4.6 J**	--	--	**0.62 B**	**2.7 J**	**2.5 J**	**1.2 J**
TOTAL PHOSPHORUS	MG/L	0.1	--	--	0.1 U	**0.12**	**0.084 B**	**0.046 B**	**0.089 B**	**0.067 B**	**0.082 B**	--	--	0.1 U	**0.072 B**	**0.17**	0.1 U
TOTAL SULFIDE	MG/L	3	--	--	3 U	3 U	3 U	3 U	3 U	3 U	3 U	--	--	3 U	**0.88 B**	3 U	3 U

**Source* : USEPA 2010. *National Recommended Water Quality Criteria*

(a) Criteria were based on salinity of 28.9 ppt, water temperature of 20.1°C, and pH of 8.0 as measured at mid-depth of the water column in Bayou Casotte Channel

(a) Criteria were based on salinity of 28.4, water temperature of 20.3, and pH of 8.2 as measured at mid-depth of the water column in Pascagoula Lower Sound Channel

NOTES: Bold values represent detected concentrations. Shaded values represent concentrations that exceed water quality criteria.

RL is reported for non-detected constituents.

RL = average reporting limit

B (inorganic) = compound was detected, but below the reporting limit (value is estimated)

J (inorganic) = detected in the laboratory method blank

G = diluted due to matrix interference

U = compound was analyzed, but not detected

TABLE 11. METAL CONCENTRATIONS (UG/L) IN SITE WATER AND STANDARD ELUTRIATES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

					BAYOU CASOTTE CHANNEL							PASCAGOULA LOWER SOUND			
ANALYTE	UNITS	Average MDL	USEPA ACUTE CRITERIA*	USEPA CHRONIC CRITERIA*	Site Water (BCW-WAT)	Elutriate BCW-01	Elutriate BCW-02	Elutriate BCW-03	Elutriate BCW-04	Elutriate BCW-05	Elutriate BCW-06	Site Water (PLS-WAT)	Elutriate PLS-01/02	Elutriate PLS-03/04	Elutriate PLS-05/06
ALUMINUM	UG/L	12.8	--	--	**733**	12.8 U	12.8 U	12.8 U	**52.3 B**	12.8 U	12.8 U	**307**	12.8 U	12.8 U	12.8 U
ANTIMONY	UG/L	0.094	--	--	**1.1 B**	**2.6 B**	**4.2 B**	**1.8 B**	**2.8 B**	**1.5 B**	**1.5 B**	**0.28 B**	**2.1 B**	**2.9 B**	**0.91 B**
ARSENIC	UG/L	1.5	69	36	**5.2**	**12.6**	**10.2**	**10.5**	**13.4**	**16.8**	**11.8**	**3.1 B**	**11.8**	**12.6**	**9.1**
BERYLLIUM	UG/L	0.18	--	--	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
CADMIUM	UG/L	0.57	40	8.8	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
CHROMIUM	UG/L	2.7	1,100	50	**7.2 B**	**8 B**	**8.5 B**	**13.6**	**11.6**	**10.1**	**10.2**	**13.4**	**9.5 B**	**8.8 B**	**8.8 B**
COBALT	UG/L	0.13	--	--	**0.54 B**	**1.2 B**	**0.76 B**	**1.5 B**	**1 B**	**0.9 B**	**0.8 B**	**0.78 B**	**0.98 B**	**0.62 B**	**0.62 B**
COPPER	UG/L	1.2	4.8	3.1	**1.5 B**	**11.7**	**1.8 B**	**6.3 B**	**3.1 B**	**3 B**	**1.9 B**	**2.1 B**	**2.1 B**	**12.8**	**2.4 B**
IRON	UG/L	30.5	--	--	**550**	**159 B J**	**154 B J**	**156 B J**	**183 B J**	**149 B J**	**171 B J**	**348**	**163 B J**	**154 B J**	**159 B J**
LEAD	UG/L	0.096	210	8.1	0.096 U	**0.53 B**	0.096 U	0.096 U	**0.26 B**	**0.16 B**	0.096 U	**0.58 B**	0.096 U	0.096 U	0.096 U
MANGANESE	UG/L	0.19	--	--	**27.9**	**1,230**	**5,340**	**1,140**	**3,320**	**5,910**	**3,830**	**16.8 E**	**752**	**180**	**234**
MERCURY	UG/L	0.042	1.8	0.94	0.038 U	0.038 U	0.077 U	0.038 U	0.038 U	0.038 U	0.038 U	0.038 U	0.038 U	0.038 U	0.038 U
NICKEL	UG/L	0.87	74	8.2	0.87 U	**6**	**1.1 B**	**8.6**	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U
SILVER	UG/L	0.18	1.9	--	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
THALLIUM	UG/L	0.076	--	--	**0.32 B**	0.076 U	**0.13 B**	**0.62 B**	**0.12 B**	**0.095 B**	0.076 U	0.076 U	0.076 U	0.076 U	0.076 U
TIN	UG/L	7.5	--	--	**12.8 B**	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U
ZINC	UG/L	4.8	90	81	**5.1 B**	**14.7 B**	**4.9 B**	**8.5 B**	**6.9 B**	**6.9 B**	4.8 U	**8.4 B**	4.8 U	4.8 U	**5.7 B**

**Source* : USEPA 2010. *National Recommended Water Quality Criteria*

NOTES: Bold values represent detected concentrations. Shaded values represent concentrations that exceed water quality criteria.

MDL is reported for non-detected constituents.

MDL = average method detection limit

B (inorganic) = compound was detected, but below the reporting limit (value is estimated)

J (inorganic) = detected in the laboratory method blank

U = compound was analyzed, but not detected

TABLE 12. PAH CONCENTRATIONS (UG/L) IN SITE WATER AND STANDARD ELUTRIATES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

			BAYOU CASOTTE CHANNEL							PASCAGOULA LOWER SOUND			
ANALYTE	UNITS	Average MDL	Site Water (BCW-WAT)	Elutriate BCW-01	Elutriate BCW-02	Elutriate BCW-03	Elutriate BCW-04	Elutriate BCW-05	Elutriate BCW-06	Site Water (PLS-WAT)	Elutriate PLS-01/02	Elutriate PLS-03/04	Elutriate PLS-05/06
Low Molecular Weight (LMW) PAHs													
1-METHYLNAPHTHALENE	UG/L	0.028	0.013 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.013 U	0.028 U	0.028 U	0.028 U
2-METHYLNAPHTHALENE	UG/L	0.024	0.011 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.011 U	0.024 U	0.024 U	0.024 U
ACENAPHTHENE	UG/L	0.029	0.014 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.014 U	0.029 U	0.029 U	0.029 U
ANTHRACENE	UG/L	0.031	**1**	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.014 U	0.031 U	0.031 U	0.031 U
FLUORENE	UG/L	0.043	**0.079 J**	0.043 U	0.043 U	0.043 U	0.043 U	0.043 U	0.043 U	0.02 U	0.043 U	0.043 U	0.043 U
NAPHTHALENE	UG/L	0.028	0.013 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.013 U	0.028 U	0.028 U	0.028 U
PHENANTHRENE	UG/L	0.085	**0.36 B**	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	**0.1 J B**	0.085 U	**0.093 J**	0.085 U
TOTAL LMW PAHS (ND=1/2MDL) (a)	UG/L	--	**1.46**	0.134	0.134	0.134	0.134	0.134	0.134	**0.143**	0.134	**0.185**	0.134
TOTAL LMW PAHS (ND=MDL) (a)	UG/L	--	**1.49**	0.268	0.268	0.268	0.268	0.268	0.268	**0.185**	0.268	**0.276**	0.268
High Molecular Weight (HMW) PAHs													
BENZO(A)ANTHRACENE	UG/L	0.029	**8.1**	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.014 U	0.029 U	0.029 U	0.029 U
BENZO(A)PYRENE	UG/L	0.027	**5.9**	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.013 U	0.027 U	0.027 U	0.027 U
CHRYSENE	UG/L	0.028	**8.9**	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.013 U	0.028 U	0.028 U	0.028 U
DIBENZO(A,H)ANTHRACENE	UG/L	0.031	**9.2**	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.015 U	0.031 U	0.031 U	0.031 U
FLUORANTHENE	UG/L	0.032	**3.5**	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.015 U	0.032 U	0.032 U	0.032 U
PYRENE	UG/L	0.031	**3.1**	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.015 U	0.031 U	0.031 U	0.031 U
TOTAL HMW PAHS (ND=1/2MDL) (b)	UG/L	--	**38.7**	0.089	0.089	0.089	0.089	0.089	0.089	0.0425	0.089	0.089	0.089
TOTAL HMW PAHS (ND=MDL) (b)	UG/L	--	**38.7**	0.178	0.178	0.178	0.178	0.178	0.178	0.085	0.178	0.178	0.178
Other PAHs													
ACENAPHTHYLENE	UG/L	0.03	0.014 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.014 U	0.03 U	0.03 U	0.03 U
BENZO(B)FLUORANTHENE	UG/L	0.031	**7.8**	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.015 U	0.031 U	0.031 U	0.031 U
BENZO(G,H,I)PERYLENE	UG/L	0.03	**8.9**	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.014 U	0.03 U	0.03 U	0.03 U
BENZO(K)FLUORANTHENE	UG/L	0.11	**9.2**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.051 U	0.11 U	0.11 U	0.11 U
INDENO(1,2,3-CD)PYRENE	UG/L	0.04	**8.9**	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.019 U	0.04 U	0.04 U	0.04 U
TOTAL PAHS (ND=1/2MDL) (c)	UG/L	--	**75.0**	0.344	0.344	0.344	0.344	0.344	0.344	**0.242**	0.344	**0.394**	0.344
TOTAL PAHS (ND=MDL) (c)	UG/L	--	**75.0**	0.687	0.687	0.687	0.687	0.687	0.687	**0.383**	0.687	**0.695**	0.687

There are no USEPA saltwater acute or chronic criteria for aquatic life for the tested PAHs or total PAH concentrations.

NOTES: Bold values represent detected concentrations.

MDL is reported for non-detected constituents.

(a) Low molecular weight (LMW) PAHs (NOAA 1989)

(b) High molecular weight (HMW) PAHs (NOAA 1989)

(c) Total PAHs is a sum of each individual PAH concentration, NOT the sum of the LMW and HMW PAHs

MDL = average method detection limit

J (organic) = compound was detected, but below the reporting limit (value is estimated)

B (organic) = detected in the laboratory method blank

U = compound was analyzed, but not detected

TABLE 13. PCB CONGENER CONCENTRATIONS (NG/L) IN SITE WATER AND STANDARD ELUTRIATES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

				BAYOU CASOTTE CHANNEL							PASCAGOULA LOWER SOUND			
ANALYTE	UNITS	Average MDL	USEPA CHRONIC CRITERIA**	Site Water (BCW-WAT)	Elutriate BCW-01	Elutriate BCW-02	Elutriate BCW-03	Elutriate BCW-04	Elutriate BCW-05	Elutriate BCW-06	Site Water (PLS-WAT)	Elutriate PLS-01/02	Elutriate PLS-03/04	Elutriate PLS-05/06
PCB 8 (BZ) *	NG/L	0.38	--	**0.42 J PG**	**1.8**	**0.92 J PG**	0.38 U	0.38 U	0.38 U	**1 PG**	**0.5 J PG**	0.38 U	0.38 U	0.38 U
PCB 18 (BZ) *	NG/L	0.38	--	0.46 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.46 U	0.38 U	0.38 U	0.38 U
PCB 28 (BZ) *	NG/L	0.44	--	0.41 U	**0.58 J PG**	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.41 U	0.44 U	0.44 U	0.44 U
PCB 44 (BZ) *	NG/L	0.46	--	0.41 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.41 U	0.46 U	0.46 U	0.46 U
PCB 49 (BZ)	NG/L	0.28	--	0.43 U	0.28 U	0.28 U	**0.71 J**	0.28 U	0.28 U	0.28 U	0.43 U	0.28 U	0.28 U	0.28 U
PCB 52 (BZ) *	NG/L	0.43	--	0.41 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.41 U	0.43 U	0.43 U	0.43 U
PCB 66 (BZ) *	NG/L	0.48	--	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
PCB 77 (BZ) *	NG/L	0.48	--	0.42 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.42 U	0.48 U	0.48 U	0.48 U
PCB 87 (BZ)	NG/L	0.43	--	0.39 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.39 U	0.43 U	0.43 U	0.43 U
PCB 90 (BZ)	NG/L	0.45	--	0.74 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.74 U	0.45 U	0.45 U	0.45 U
PCB 101 (BZ) *	NG/L	0.48	--	0.39 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.39 U	0.48 U	0.48 U	0.48 U
PCB 105 (BZ) *	NG/L	0.47	--	0.36 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.36 U	0.47 U	0.47 U	0.47 U
PCB 118 (BZ) *	NG/L	0.49	--	0.51 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.51 U	0.49 U	0.49 U	0.49 U
PCB 126 (BZ) *	NG/L	0.32	--	0.37 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.37 U	0.32 U	0.32 U	0.32 U
PCB 128 (BZ) *	NG/L	0.5	--	0.34 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.34 U	0.5 U	0.5 U	0.5 U
PCB 138 (BZ) *	NG/L	0.49	--	0.32 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.32 U	0.49 U	0.49 U	0.49 U
PCB 153 (BZ) *	NG/L	0.46	--	0.37 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.37 U	0.46 U	0.46 U	0.46 U
PCB 156 (BZ)	NG/L	0.44	--	0.36 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.36 U	0.44 U	0.44 U	0.44 U
PCB 169 (BZ) *	NG/L	0.24	--	0.41 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.41 U	0.24 U	0.24 U	0.24 U
PCB 170 (BZ) *	NG/L	0.23	--	0.35 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.35 U	0.23 U	0.23 U	0.23 U
PCB 180 (BZ) *	NG/L	0.29	--	0.35 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.35 U	0.29 U	0.29 U	0.29 U
PCB 183 (BZ)	NG/L	0.5	--	0.35 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.35 U	0.5 U	0.5 U	0.5 U
PCB 184 (BZ)	NG/L	0.23	--	0.4 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.4 U	0.23 U	0.23 U	0.23 U
PCB 187 (BZ) *	NG/L	0.48	--	0.37 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.37 U	0.48 U	0.48 U	0.48 U
PCB 195 (BZ)	NG/L	0.29	--	0.37 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.37 U	0.29 U	0.29 U	0.29 U
PCB 206 (BZ)	NG/L	0.3	--	0.36 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.36 U	0.3 U	0.3 U	0.3 U
PCB 209 (BZ)	NG/L	0.26	--	0.42 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.42 U	0.26 U	0.26 U	0.26 U
TOTAL PCBs (ND=1/2MDL)	NG/L	--	30	**10.7**	**14.2**	**11.7**	**11.4**	10.2	10.2	**11.9**	**10.8**	10.2	10.2	10.2
TOTAL PCBs (ND=MDL)	NG/L	--	30	**20.5**	**23.6**	**21.5**	**21.3**	20.5	20.5	**21.7**	**20.6**	20.5	20.5	20.5

* PCB congeners used for Total PCB summation, as per Table 9-3 of the ITM (USEPA/USACE 1998)

There are no USEPA saltwater acute criteria for aquatic life for the tested PCB congeners or total PCB concentrations.

***Source* : USEPA 2010. *National Recommended Water Quality Criteria*

NOTES: Bold values represent detected concentrations. Shaded values represent concentrations that exceed water quality criteria.

MDL is reported for non-detected constituents.

MDL = average method detection limit

J (organic) = compound was detected, but below the reporting limit (value is estimated)

PG = the percent difference between the original and confirmation analysis is greater than 40%

U = compound was analyzed, but not detected

TABLE 14. CHLORINATED PESTICIDE CONCENTRATIONS (UG/L) IN SITE WATER AND STANDARD ELUTRIATES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

					BAYOU CASOTTE CHANNEL							PASCAGOULA LOWER SOUND			
ANALYTE	**UNITS**	**Average MDL**	**USEPA ACUTE CRITERIA***	**USEPA CHRONIC CRITERIA***	**Site Water (BCW-WAT)**	**Elutriate BCW-01**	**Elutriate BCW-02**	**Elutriate BCW-03**	**Elutriate BCW-04**	**Elutriate BCW-05**	**Elutriate BCW-06**	**Site Water (PLS-WAT)**	**Elutriate PLS-01/02**	**Elutriate PLS-03/04**	**Elutriate PLS-05/06**
2,4'-DDD	UG/L	0.0008	--	--	0.00015 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0016 U	0.0016 U	0.00016 U	0.00016 U	0.00016 U	0.00016 U
4,4'-DDD	UG/L	0.0008	--	--	0.00064 U	0.0034 U	**0.0084 PG**	0.0034 U	0.0034 U	0.0067 U	0.0067 U	0.00065 U	0.00067 U	0.00067 U	0.00067 U
2,4'-DDE	UG/L	0.0011	--	--	0.00014 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0016 U	0.0016 U	0.00015 U	0.00016 U	0.00016 U	0.00016 U
4,4'-DDE	UG/L	0.0032	--	--	0.00076 U	0.004 U	0.004 U	0.004 U	0.004 U	0.0079 U	0.0079 U	0.00077 U	0.00079 U	0.00079 U	0.00079 U
2,4'-DDT	UG/L	0.0038	--	--	0.00021 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0022 U	0.0022 U	0.00021 U	0.00022 U	0.00022 U	0.00022 U
4,4'-DDT	UG/L	0.0035	0.13	0.001	0.00071 U	0.0037 U	**0.0067 PG**	0.0037 U	0.0037 U	0.0074 U	0.0074 U	0.00072 U	0.00074 U	0.00074 U	0.00074 U
ALDRIN	UG/L	0.0040	1.3	--	0.0008 U	0.0042 U	0.0042 U	0.0042 U	0.0042 U	0.0083 U	0.0083 U	0.00081 U	0.00083 U	0.00083 U	0.00083 U
ALPHA-BHC	UG/L	0.0032	--	--	0.00063 U	0.0033 U	**0.0057 J PG**	0.0033 U	0.0033 U	0.0066 U	0.0066 U	**0.00084 J PG**	**0.0012 J PG**	**0.0016**	**0.00083 J PG**
BETA-BHC	UG/L	0.0048	--	--	0.00096 U	0.005 U	**0.057**	**0.021 PG**	0.005 U	0.01 U	0.01 U	0.00097 U	0.001 U	0.001 U	**0.009 PG**
CHLORDANE (TECHNICAL)	UG/L	0.0077	0.09	0.004	0.0016 U	0.0082 U	0.0082 U	0.0082 U	0.0082 U	0.016 U	0.016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U
CHLOROBENSIDE	UG/L	0.0071	--	--	**0.0065**	0.0074 U	0.0074 U	0.0074 U	0.0074 U	0.015 U	0.015 U	**0.0065**	0.0015 U	0.0015 U	0.0015 U
DACHTAL	UG/L	0.0016	--	--	0.00033 U	0.0017 U	0.0017 U	0.0017 U	0.0017 U	0.0034 U	**0.0088 J PG**	0.00033 U	0.00034 U	**0.0015 J PG**	0.00034 U
DELTA-BHC	UG/L	0.0021	--	--	**0.00074 J PG**	**0.0055 J PG**	**0.0071 PG**	0.0022 U	0.0022 U	0.0044 U	0.0044 U	**0.00089 J PG**	0.00044 U	0.00044 U	**0.0018 PG**
DIELDRIN	UG/L	0.0039	0.71	0.0019	0.00079 U	0.0041 U	0.0041 U	0.0041 U	0.0041 U	0.0082 U	0.0082 U	0.0008 U	0.00082 U	0.00082 U	0.00082 U
ENDOSULFAN I	UG/L	0.0045	0.034	0.0087	0.0009 U	0.0047 U	0.0047 U	0.0047 U	0.0047 U	0.0094 U	0.0094 U	0.00091 U	0.00094 U	0.00094 U	0.00094 U
ENDOSULFAN II	UG/L	0.0047	0.034	0.0087	0.00094 U	0.0049 U	0.0049 U	0.0049 U	0.0049 U	0.0098 U	0.0098 U	0.00095 U	0.00098 U	0.00098 U	0.00098 U
ENDOSULFAN SULFATE	UG/L	0.0027	--	--	0.00055 U	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.0057 U	0.0057 U	0.00055 U	0.00057 U	0.00057 U	0.00057 U
ENDRIN	UG/L	0.0046	0.037	0.0023	0.00092 U	0.0048 U	0.0048 U	0.0048 U	**0.0077 PG**	0.0096 U	0.0096 U	0.00093 U	0.00096 U	0.00096 U	0.00096 U
ENDRIN ALDEHYDE	UG/L	0.0043	--	--	0.00086 U	0.0045 U	0.0045 U	0.0045 U	0.0045 U	0.009 U	0.009 U	0.00087 U	0.0009 U	0.0009 U	0.0009 U
GAMMA-BHC (LINDANE)	UG/L	0.0038	0.16	--	0.00077 U	**0.011 PG**	**0.014**	**0.006 J PG**	0.004 U	**0.02**	**0.018**	0.00078 U	**0.006**	**0.0069**	**0.005 PG**
HEPTACHLOR	UG/L	0.0048	0.053	0.0036	0.00095 U	**0.0073 PG**	**0.024 PG**	0.005 U	0.005 U	0.0099 U	0.0099 U	0.00096 U	0.00099 U	0.00099 U	0.00099 U
HEPTACHLOR EPOXIDE	UG/L	0.0046	0.053	0.0036	0.00093 U	0.0048 U	0.0048 U	0.0048 U	0.0048 U	0.0097 U	0.0097 U	0.00094 U	0.00097 U	0.00097 U	0.00097 U
METHOXYCHLOR	UG/L	0.0044	--	0.03	0.00087 U	0.0046 U	**0.0063 J PG**	0.0046 U	0.0046 U	0.0091 U	0.0091 U	0.00088 U	0.00091 U	0.00091 U	0.00091 U
MIREX	UG/L	0.0023	--	0.001	0.00046 U	0.0024 U	0.0024 U	0.0024 U	0.0024 U	0.0048 U	0.0048 U	0.00047 U	0.00048 U	0.00048 U	0.00048 U
TOXAPHENE	UG/L	0.0033	0.21	0.0002	0.018 U	0.0034 U	0.0034 U	0.0034 U	0.0034 U	0.0069 U	0.0069 U	0.018 U	0.00069 U	0.00069 U	0.00069 U

*Source : USEPA 2010. *National Recommended Water Quality Criteria*

NOTES: Bold values represent detected concentrations. Shaded values represent concentrations that exceed water quality criteria.

MDL is reported for non-detected constituents.

MDL = average method detection limit

J (organic) = compound was detected, but below the reporting limit (value is estimated)

PG = the percent difference between the original and confirmation analysis is greater than 40%

U = compound was analyzed, but not detected

TABLE 15. SVOC CONCENTRATIONS (UG/L) IN SITE WATER AND STANDARD ELUTRIATES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

					BAYOU CASOTTE CHANNEL							PASCAGOULA LOWER SOUND			
ANALYTE	**UNITS**	**Average MDL**	**ACUTE CRITERIA ***	**CHRONIC CRITERIA ***	**Site Water (BCW-WAT)**	**Elutriate BCW-01**	**Elutriate BCW-02**	**Elutriate BCW-03**	**Elutriate BCW-04**	**Elutriate BCW-05**	**Elutriate BCW-06**	**Site Water (PLS-WAT)**	**Elutriate PLS-01/02**	**Elutriate PLS-03/04**	**Elutriate PLS-05/06**
1,2,4-TRICHLOROBENZENE	UG/L	0.14	--	--	0.067 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.067 U	0.14 U	0.14 U	0.14 U
1,2-DICHLOROBENZENE	UG/L	0.15	--	--	0.07 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.07 U	0.15 U	0.15 U	0.15 U
1,2-DIPHENYLHYDRAZINE	UG/L	0.13	--	--	0.062 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.062 U	0.13 U	0.13 U	0.13 U
1,3-DICHLOROBENZENE	UG/L	0.15	--	--	0.07 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.07 U	0.15 U	0.15 U	0.15 U
1,4-DICHLOROBENZENE	UG/L	0.15	--	--	0.07 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.07 U	0.15 U	0.15 U	0.15 U
2,4,6-TRICHLOROPHENOL	UG/L	0.35	--	--	0.16 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.16 U	0.35 U	0.35 U	0.35 U
2,4-DICHLOROPHENOL	UG/L	0.067	--	--	0.031 U	0.067 U	0.067 U	0.067 U	0.067 U	0.067 U	0.067 U	0.031 U	0.067 U	0.067 U	0.067 U
2,4-DIMETHYLPHENOL	UG/L	0.17	--	--	**0.12 J**	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.08 U	0.17 U	0.17 U	0.17 U
2,4-DINITROPHENOL	UG/L	1.2	--	--	0.58 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	0.58 U	1.2 U	1.2 U	1.2 U
2,4-DINITROTOLUENE	UG/L	0.11	--	--	0.05 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.05 U	0.11 U	0.11 U	0.11 U
2,6-DINITROTOLUENE	UG/L	0.16	--	--	0.075 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.075 U	0.16 U	0.16 U	0.16 U
2-CHLORONAPHTHALENE	UG/L	0.03	--	--	0.014 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.014 U	0.03 U	0.03 U	0.03 U
2-CHLOROPHENOL	UG/L	0.33	--	--	0.16 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.16 U	0.33 U	0.33 U	0.33 U
2-METHYLPHENOL	UG/L	0.17	--	--	0.081 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.081 U	0.17 U	0.17 U	0.17 U
2-NITROPHENOL	UG/L	0.34	--	--	0.16 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.16 U	0.34 U	0.34 U	0.34 U
3,3'-DICHLOROBENZIDINE	UG/L	0.22	--	--	0.11 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.11 U	0.22 U	0.22 U	0.22 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	0.44	--	--	0.21 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.21 U	0.44 U	0.44 U	0.44 U
4-BROMOPHENYL PHENYL ETHER	UG/L	0.13	--	--	0.06 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.06 U	0.13 U	0.13 U	0.13 U
4-CHLORO-3-METHYLPHENOL	UG/L	0.15	--	--	0.071 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.071 U	0.15 U	0.15 U	0.15 U
4-CHLOROPHENYL PHENYL ETHER	UG/L	0.1	--	--	0.047 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.047 U	0.1 U	0.1 U	0.1 U
4-METHYLPHENOL	UG/L	0.18	--	--	0.085 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.085 U	0.18 U	0.18 U	0.18 U
4-NITROPHENOL	UG/L	1.2	--	--	0.57 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	0.57 U	1.2 U	1.2 U	1.2 U
BENZIDINE	UG/L	6.9	--	--	3.3 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	3.3 U	6.9 U	6.9 U	6.9 U
BENZOIC ACID	UG/L	1.1	--	--	0.53 U	1.1 U	**2 J**	1.1 U	**2.1 J**	**2.1 J**	1.1 U	0.53 U	1.1 U	1.1 U	1.1 U
BENZYL ALCOHOL	UG/L	0.43	--	--	0.2 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.2 U	0.43 U	0.43 U	0.43 U
BIS(2-CHLOROETHOXY)METHANE	UG/L	0.12	--	--	0.055 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.055 U	0.12 U	0.12 U	0.12 U
BIS(2-CHLOROETHYL) ETHER	UG/L	0.05	--	--	0.024 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.024 U	0.05 U	0.05 U	0.05 U
BIS(2-CHLOROISOPROPYL) ETHER	UG/L	0.039	--	--	0.019 U	0.039 U	0.039 U	0.039 U	0.039 U	0.039 U	0.039 U	0.019 U	0.039 U	0.039 U	0.039 U
BIS(2-ETHYLHEXYL) PHTHALATE	UG/L	1.6	--	--	**7.1**	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	**1.4**	1.6 U	1.6 U	1.6 U
BUTYL BENZYL PHTHALATE	UG/L	0.28	--	--	**2.8**	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	**0.22 J**	0.28 U	0.28 U	0.28 U
DIBENZOFURAN	UG/L	0.12	--	--	0.058 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.058 U	0.12 U	0.12 U	0.12 U
DIETHYL PHTHALATE	UG/L	0.29	--	--	0.14 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.14 U	0.29 U	0.29 U	0.29 U
DIMETHYL PHTHALATE	UG/L	0.15	--	--	0.072 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.072 U	0.15 U	0.15 U	0.15 U
DI-N-BUTYL PHTHALATE	UG/L	0.25	--	--	**1**	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.12 U	0.25 U	0.25 U	0.25 U
DI-N-OCTYL PHTHALATE	UG/L	0.41	--	--	**6.9**	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.19 U	0.41 U	0.41 U	0.41 U
HEXACHLOROBENZENE	UG/L	0.037	--	--	**0.35**	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.017 U	0.037 U	0.037 U	0.037 U
HEXACHLOROBUTADIENE	UG/L	0.033	--	--	0.016 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.016 U	0.033 U	0.033 U	0.033 U
HEXACHLOROCYCLOPENTADIENE	UG/L	0.1	--	--	0.049 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.049 U	0.1 U	0.1 U	0.1 U
HEXACHLOROETHANE	UG/L	0.13	--	--	0.059 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.059 U	0.13 U	0.13 U	0.13 U
ISOPHORONE	UG/L	0.13	--	--	0.061 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.061 U	0.13 U	0.13 U	0.13 U
NITROBENZENE	UG/L	0.17	--	--	0.079 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.079 U	0.17 U	0.17 U	0.17 U
N-NITROSODIMETHYLAMINE	UG/L	0.15	--	--	0.069 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.069 U	0.15 U	0.15 U	0.15 U
N-NITROSODI-N-PROPYLAMINE	UG/L	0.062	--	--	0.029 U	0.062 U	0.062 U	0.062 U	0.062 U	0.062 U	0.062 U	0.029 U	0.062 U	0.062 U	0.062 U
N-NITROSODIPHENYLAMINE	UG/L	0.17	--	--	0.08 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.08 U	0.17 U	0.17 U	0.17 U
PENTACHLOROPHENOL	UG/L	0.13	13	7.9	**0.26 J**	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.062 U	0.13 U	0.13 U	0.13 U
PHENOL	UG/L	0.12	--	--	0.055 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.055 U	0.12 U	0.12 U	0.12 U

**Source* : USEPA 2010. *National Recommended Water Quality Criteria*

NOTES: Bold values represent detected concentrations. Shaded values represent concentrations that exceed water quality criteria.

MDL is reported for non-detected constituents.

MDL = average method detection limit

J (organic) = compound was detected, but below the reporting limit (value is estimated)

U = compound was analyzed, but not detected

TABLE 16. DIOXIN AND FURAN CONGENER CONCENTRATIONS (PG/L) IN SITE WATER AND STANDARD ELUTRIATES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

				BAYOU CASOTTE CHANNEL							PASCAGOULA LOWER SOUND			
ANALYTE	UNITS	Average RL	TEF*	Site Water (BCW-WAT)	Elutriate BCW-01	Elutriate BCW-02	Elutriate BCW-03	Elutriate BCW-04	Elutriate BCW-05	Elutriate BCW-06	Site Water (PLS-WAT)	Elutriate PLS-01/02	Elutriate PLS-03/04	Elutriate PLS-05/06
2,3,7,8-TCDD	PG/L	13.0	1	3.9 U	**0.4 Q B J**	0.37 U	0.56 U	0.13 U	0.17 U	0.38 U	5.9 U	0.47 U	0.15 U	0.15 U
1,2,3,7,8-PECDD	PG/L	65.1	1	1.5 U	**1.3 Q B J**	**1.6 Q B J**	**4.1 B J**	0.12 U	0.21 U	0.3 U	1.9 U	0.35 U	**0.61 Q B J**	**0.9 Q B J**
1,2,3,4,7,8-HXCDD	PG/L	113	0.1	1 U	**1.4 B J**	**1.5 B J**	**2.2 Q B J**	0.18 U	**0.63 Q B J**	0.48 U	1.9 U	**8.5 Q B J**	**0.55 B J**	**0.64 B J**
1,2,3,6,7,8-HXCDD	PG/L	113	0.1	1.3 U	0.57 U	0.91 U	**3.5 B J**	**0.63 Q B J**	**1.1 B J**	**1.6 B J**	2.4 U	**14 Q B J**	**0.65 Q B J**	**0.57 Q B J**
1,2,3,7,8,9-HXCDD	PG/L	113	0.1	1.1 U	**2.4 B J**	**3.6 Q B J**	**3.7 Q B J**	**1.4 Q B J**	**3 B J**	**2.3 Q B J**	2 U	**21 Q B J**	**2.1 B J**	**1.1 Q B J**
1,2,3,4,6,7,8-HPCDD	PG/L	113	0.01	**4.2 J**	**12 B J**	**60 B J**	**9.4 B J**	**16 B J**	**59 B**	**45 B J**	3.2 U	**32 Q B J**	**15 B J**	**2.5 B J**
OCDD	PG/L	226	0.0003	**74 B J**	**200 B**	**1100 B**	**110 B J**	**280 B**	**1100 B**	**860 B**	**15 B J**	**350 B J**	**270 B**	**39 B J**
2,3,7,8-TCDF	PG/L	13.0	0.1	2.5 U	**0.7 Q B J**	**0.36 Q B J**	0.47 U	**0.16 Q B J**	0.13 U	0.68 U	4 U	**4.6 Q B J**	**0.12 Q B J**	**0.28 Q B J**
1,2,3,7,8-PECDF	PG/L	65.1	0.03	1.3 U	**1.4 B J**	**1.4 Q B J**	**3 Q B J**	**0.31 Q B J**	0.12 U	0.3 U	2 U	0.35 U	**0.5 B J**	**0.92 Q B J**
2,3,4,7,8-PECDF	PG/L	65.1	0.3	1.1 U	**1.4 B J**	0.26 U	**2.8 Q B J**	**0.24 Q B J**	**0.2 Q B J**	**0.44 Q B J**	1.7 U	0.39 U	**0.31 Q B J**	**0.71 Q B J**
1,2,3,4,7,8-HXCDF	PG/L	113	0.1	0.68 U	**0.84 Q B J**	**1.1 Q B J**	**2.8 Q B J**	**0.3 Q B J**	0.16 U	**0.41 Q B J**	1.3 U	**13 Q B J**	**0.48 Q B J**	**0.7 Q B J**
1,2,3,6,7,8-HXCDF	PG/L	113	0.1	0.68 U	**1.1 Q B J**	**0.9 Q B J**	**2.1 Q B J**	**0.24 Q B J**	**0.37 Q B J**	**0.6 Q B J**	1.4 U	**12 Q B J**	**0.42 B J**	**0.46 Q B J**
2,3,4,6,7,8-HXCDF	PG/L	113	0.1	0.75 U	**1.2 Q B J**	**0.95 Q B J**	**2.7 Q B J**	**0.3 Q B J**	0.17 U	**0.98 Q B J**	1.6 U	**13 Q B J**	**0.37 Q B J**	**0.64 B J**
1,2,3,7,8,9-HXCDF	PG/L	113	0.1	0.86 U	**2.2 Q B J**	**1.3 Q B J**	**4.7 Q B J**	**0.39 Q B J**	0.2 U	0.47 U	1.8 U	**16 B J**	**0.78 Q B J**	**0.9 Q B J**
1,2,3,4,6,7,8-HPCDF	PG/L	113	0.01	1 U	**1.8 Q B J**	**2.4 Q B J**	**3.1 Q B J**	**0.49 Q B J**	**1.7 B J**	**1.6 Q B J**	1.7 U	**13 B J**	**0.9 Q B J**	**0.68 Q B J**
1,2,3,4,7,8,9-HPCDF	PG/L	113	0.01	1.3 U	**1.3 Q B J**	**1.1 B J**	**3.4 Q B J**	**0.46 B J**	0.22 U	**0.62 Q B J**	2.5 U	**12 B J**	**0.57 B J**	**0.77 B J**
OCDF	PG/L	226	0.0003	1.6 U	**2.9 Q B J**	**3.1 Q B J**	**8.4 B J**	**1 B J**	**1.9 Q B J**	**2.9 B J**	2.6 U	**22 B J**	**2.3 B J**	**2.3 Q B J**
DIOXIN TEQ (ND=0)	PG/L	--	--	**0.0642**	**1.02**	**1.09**	**4.58**	**0.249**	**1.35**	**0.869**	**0.0045**	**1.96**	**0.559**	**0.172**
DIOXIN TEQ (ND=1/2RL)	PG/L	--	--	**3.40**	**1.05**	**1.36**	**4.88**	**0.383**	**1.57**	**1.29**	**5.05**	**2.44**	**0.634**	**0.247**
DIOXIN TEQ (ND=RL)	PG/L	--	--	**6.74**	**1.08**	**1.63**	**5.19**	**0.517**	**1.80**	**1.72**	**10.1**	**2.91**	**0.709**	**0.322**

**Source* : The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds. *Toxicological Sciences* 2006 93(2):223-241

There are no USEPA saltwater acute or chronic criteria for the tested dioxin and furan congeners.

NOTES: Bold values represent detected concentrations.

Dioxins were not tested for in Pascagoula Harbor elutriates created from locations PH09-03 through PH09-09

RL is reported for non-detected constituents.

RL = average reporting limit

TEF = toxicity equivalency factor

TEQ = toxicity equivalency quotient

B (organic) = detected in the laboratory method blank

J (organic) = compound was detected, but below the reporting limit (value is estimated)

Q = estimated maximum possible concentration

U = compound was analyzed, but not detected

TABLE 17. BUTYLTIN CONCENTRATIONS (UG/L) IN SITE WATER AND STANDARD ELUTRIATES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

					BAYOU CASOTTE CHANNEL							PASCAGOULA LOWER SOUND			
ANALYTE	UNITS	Average RL	USEPA ACUTE CRITERIA*	USEPA CHRONIC CRITERIA*	Site Water (BCW-WAT)	Elutriate BCW-01	Elutriate BCW-02	Elutriate BCW-03	Elutriate BCW-04	Elutriate BCW-05	Elutriate BCW-06	Site Water (PLS-WAT)	Elutriate PLS-01/02	Elutriate PLS-03/04	Elutriate PLS-05/06
MONOBUTYLTIN**	UG/L	0.05	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIBUTYLTIN**	UG/L	0.01	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
TRIBUTYLTIN**	UG/L	0.012	0.42	0.0074	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U
TETRABUTYLTIN	UG/L	0.0086	--	--	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U
TOTAL BUTYLTINS (ND=RL)	UG/L	--	--	--	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438

**Source* : USEPA 2010. *National Recommended Water Quality Criteria*

** = Butyltins used to calculate total organotins

NOTES: Bold values represent detected concentrations. Shaded values represent concentrations that exceed water quality criteria.
RL is reported for non-detected constituents.

RL = average reporting limit

U = compound was analyzed, but not detected

TABLE 18. SUMMARY OF RESULTS FOR WATER COLUMN BIOASSAYS
PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

SAMPLE	*Mytilus edulis*			*Menidia beryllina*			*Americamysis bahia*		
	48-HOUR EC_{50} (% ELUTRIATE)	STATISTICAL DIFFERENCE 100% VS. CONTROL[a]	DILUTION REQUIRED TO ACHIEVE 0.01 EC_{50}	96-HOUR LC_{50} (% ELUTRIATE)	STATISTICAL DIFFERENCE 100% VS. CONTROL[a]	DILUTION REQUIRED TO ACHIEVE 0.01 LC_{50}	96-HOUR LC_{50} (% ELUTRIATE)	STATISTICAL DIFFERENCE 100% VS. CONTROL[a]	DILUTION REQUIRED TO ACHIEVE 0.01 LC_{50}
BAYOU CASOTTE CHANNEL									
BCW-01	82.2	Yes	122	>100	Yes	100	>100	No	--
BCW-02	57.9	Yes	173	>100	Yes	100	>100	No	--
BCW-03	78.3	Yes	128	>100	No	--	>100	No	--
BCW-04	63.5	Yes	157	>100	Yes	100	>100	No	--
BCW-05	>100	Yes	100	>100	Yes	100	>100	No	--
BCW-06	71	Yes	141	>100	No	--	>100	No	--
PASCAGOULA LOWER SOUND									
PLS-01/02	62.5	Yes	160	>100	Yes	100	>100	No	--
PLS-03/04	69.3	Yes	144	>100	Yes	100	>100	Yes	100
PLS-05/06	>100	No	--	>100	No	--	>100	No	--

(a) Statistical significance analyzed at p=0.05; survival (LC50) or effect (EC50) in 100% elutriate concentration significantly lower than the control.

TABLE 19. SUMMARY OF SURVIVAL RESULTS FOR BIOACCUMULATION TESTS

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

SAMPLE	*Neanthes arenaceodentata*			*Leptocheirus plumulosus*		
	NO. ALIVE/NO. EXPOSED[(a)]	10-DAY MEAN PERCENT SURVIVAL	STATISTICAL DIFFERENCE VS. REFERENCE[(b)]	NO. ALIVE/NO. EXPOSED[(a)]	10-DAY MEAN PERCENT SURVIVAL	STATISTICAL DIFFERENCE VS. REFERENCE[(b)]
REFERENCE SITES						
RS-PAS-B	22 / 25	88	--	91 / 100	91	--
RS-PAS-D	24 / 25	96	--	90 / 100	90	--
BAYOU CASOTTE CHANNEL						
BCW-01	24 / 25	96	No	90 / 100	90	No
BCW-02	24 / 25	96	No	82 / 100	82	No
BCW-03	23 / 26	88	No	94 / 100	94	No
BCW-04	26 / 26	100	No	95 / 100	95	No
BCW-05	22 / 25	88	No	92 / 100	92	No
BCW-06	25 / 25	100	No	93 / 100	93	No
PASCAGOULA LOWER SOUND						
PLS-01/02	24 / 25	96	No	97 / 100	97	No
PLS-03/04	25 / 26	96	No	98 / 100	98	No
PLS-05/06	25 / 25	100	No	98 / 100	98	No
CONTROL SAMPLE						
LABORATORY CONTROL	23 / 25	92	No	98 / 100	98	No

(a) Total for five replicates of 25 animals, except laboratory control, which had three replicates of 25 animals.

(b) Statistical significance analyzed at p=0.05; PLS-05/06-SED statistically compared to reference sample RS-PAS-D and all other channel sediments statistically compared to RS-PAS-B.

TABLE 20. SUMMARY OF SURVIVAL RESULTS FOR BIOACCUMULATION TESTS

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

SAMPLE	*Nereis virens*			*Macoma nasuta*		
	NO. ALIVE/NO. EXPOSED[(a)]	28-DAY MEAN PERCENT SURVIVAL	STATISTICAL DIFFERENCE VS. REFERENCE[(b)]	NO. ALIVE/NO. EXPOSED[(]	28-DAY MEAN PERCENT SURVIVAL	STATISTICAL DIFFERENCE VS. REFERENCE[(b)]
REFERENCE SITES						
RS-PAS-B	124 / 125	99	--	241 / 250	96	--
RS-PAS-D	124 / 125	99	--	236 / 250	94	--
BAYOU CASOTTE CHANNEL						
BCW-01	124 / 125	99	No	237 / 250	95	No
BCW-02	112 / 125	90	No	227 / 250	91	No
BCW-03	123 / 125	98	No	230 / 250	92	No
BCW-04	122 / 125	98	No	232 / 250	93	No
BCW-05	122 / 125	98	No	228 / 250	91	No
BCW-06	122 / 125	98	No	239 / 250	96	No
PASCAGOULA LOWER SOUND						
PLS-01/02	122 / 125	98	No	234 / 250	94	No
PLS-03/04	121 / 125	97	No	226 / 250	90	No
PLS-05/06	122 / 125	98	No	238 / 250	95	No
CONTROL SAMPLE						
LABORATORY CONTROL	74 / 75	100	No	146 / 150	97	No

(a) Total for five replicates of 25 animals, except laboratory control, which had three replicates of 25 animals.

(b) Statistical significance analyzed at p=0.05; PLS-05/06-SED statistically compared to reference sample RS-PAS-D and all other channel sediments statistically compared to RS-PAS-B.

TABLE 21A. MEAN METAL CONCENTRATIONS (MG/KG) IN TISSUES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

		REFERENCE SITE B		CONTROL		BCW-02		BCW-06		PLS-03/04	
		Worms	Clams	Worms	Clams	Worms	Clams	Worms	Clams	Worms	Clams
ANALYTE	UNITS	Lipids = 0.57%	Lipids = 0.44%	Lipids = 0.55%	Lipids = 0.40%	Lipids = 0.72%	Lipids = 0.34%	Lipids = 0.65%	Lipids = 0.35%	Lipids = 0.60%	Lipids = 0.47%
ARSENIC	MG/KG	2.2	2.42	2.43	2.2	2	2.42	2.12	2.82	1.94	2.58
CADMIUM	MG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1
CHROMIUM	MG/KG	0.234	0.528	0.257	0.417	0.2*	0.538	ND*	0.466	0.268	0.466
COPPER	MG/KG	1.22	2.12	1.4	2.2	1.54	2.4	1.36	2.04	1.4	2.3
LEAD	MG/KG	0.11	0.326	0.133	0.227	ND	0.254	ND	0.284	0.1	0.746
MERCURY	MG/KG	0.039	ND	0.038	ND	0.038	ND	0.037	ND	0.039	ND
NICKEL	MG/KG	0.236	0.41	0.187	0.34	0.148	0.412	0.15	0.386	0.17	0.414
SILVER	MG/KG	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1
ZINC	MG/KG	26.8	12.5	22	9.43	20.6	11.8	24.7	11.6	26.6	12.4

NOTES: For pre-test and control tissues n = 3 and for all other tissue tests n = 5.

* = tissue tests where n = 4 because an outlier was not used to calculate the mean concentration.

Nereis virens species used for worm tissue tests and *Macoma nasuta* used for clam tissue tests.

ND = not detected or was detected below the reporting limit in each of the tested tissue replicates.

Analyte concentration is significantly higher than the reference site concentration (p>0.05)

Analyte concentration is significantly higher than the reference site concentration (p>0.05) and the pre-test tissue concentration (p>0.05)

TABLE 21B. MEAN DIOXIN AND FURAN CONGENER CONCENTRATIONS (NG/KG) IN TISSUES

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

			REFERENCE SITE B		CONTROL		BCW-05		BCW-06		PLS-01/02	
			Worms	Clams	Worms	Clams	Worms	Clams	Worms	Clams	Worms	Clams
ANALYTE	**UNITS**	**TEF***	Lipids = 0.57%	Lipids = 0.44%	Lipids = 0.55%	Lipids = 0.40%	Lipids = 0.69%	Lipids = 0.38%	Lipids = 0.65%	Lipids = 0.35%	Lipids = 0.68%	Lipids = 0.36%
2,3,7,8-TCDD	NG/KG	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,7,8-PECDD	NG/KG	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4,7,8-HXCDD	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,6,7,8-HXCDD	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,7,8,9-HXCDD	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4,6,7,8-HPCDD	NG/KG	0.01	ND	ND	ND	ND	ND	ND	ND	ND	6.74	5.2*
OCDD	NG/KG	0.0003	16	15.6	16	ND	28.2	36	25.2	53	63.8	66.6
2,3,7,8-TCDF	NG/KG	0.1	ND	ND	ND	ND	ND	ND	1.02	ND	1.04	ND
1,2,3,7,8-PECDF	NG/KG	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,7,8-PECDF	NG/KG	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4,7,8-HXCDF	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,6,7,8-HXCDF	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6,7,8-HXCDF	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,7,8,9-HXCDF	NG/KG	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4,6,7,8-HPCDF	NG/KG	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4,7,8,9-HPCDF	NG/KG	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OCDF	NG/KG	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIOXIN TEQ (ND=1/2RL)	NG/KG	--	4.63	5.68	3.78	5.7	3.32	5.65	2.67	5.65	3.97	15.6
DIOXIN TEQ (ND=RL)	NG/KG	--	9.26	11.4	7.56	11.4	6.63	11.3	5.34	11.3	7.87	31.2

**Source* : Van den Berg, M, et al. 2006. The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. *Toxicological Sciences 93(2):223-241.*

NOTES: For pre-test and control tissues n = 3 and for all other tissue tests n = 5.

* = tissue tests where n = 4 because an outlier was not used to calculate the mean concentration.

Mean concentrations were lipid-normalized prior to statistical comparisons to the reference site.

Nereis virens species used for worm tissue tests and *Macoma nasuta* used for clam tissue tests.

ND = not detected or was detected below the reporting limit in each of the tested tissue replicates.

TEF = toxicity equivalency factor

TEQ = toxicity equivalency quotient

Analyte concentration is significantly higher than the reference site concentration (p>0.05)

Analyte concentration is significantly higher than the reference site concentration (p>0.05) and the pre-test tissue concentration (p>0.05)

TABLE 22. COMPARISON OF THE UPPER 95% CONFIDENCE LEVELS OF THE MEAN TISSUE CONCENTRATIONS TO USFDA ACTION/GUIDANCE/TOLERANCE LEVELS[(a)]

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

		USFDA ACTION/GUIDANCE/TOLERANCE LEVELS[(a)]		**REFERENCE SITE B**		**BCW-02**		**BCW-06**		**PLS-03/04**	
ANALYTE[(b)]	**UNITS**	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***
ARSENIC	MG/KG	76	86	2.42	2.64	2.12	2.71	2.28	3.05	2.05	2.91
CADMIUM	MG/KG	4	3	--	--	--	--	--	--	--	0.1
CHROMIUM	MG/KG	12	13	0.271	0.528	0.2*	0.574	--	0.492	0.31	0.497
LEAD	MG/KG	1.5	1.7	0.122	0.383	--	0.377	--	0.349	0.1	1.18
MERCURY	MG/KG	1	1	0.042	--	0.040	--	0.04	--	0.04	--
NICKEL	MG/KG	70	80	0.259	0.436	0.158	0.480	0.165	0.431	0.183	0.496

[(a)]*Sources:* Southeast Regional Implementation Manual (SERIM), USACE/USEPA 2008

USFDA 2001. Fish and Fishery Products Hazards and Controls Guidance. Third Edition. U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition. June.

[(b)]Values provided only for metal constituents that were tested and detected in this program.

* = tissue tests where n = 4 because an outlier was not used to calculate the mean concentration.

NOTE: Concentrations of metals in tissue were not analyzed in samples BCW-05 or PLS-01/02

TABLE 23. COMPARISON OF THE MEAN TISSUE CONCENTRATIONS TO USEPA REGION 4 BACKGROUND CONCENTRATIONS FROM THE NORTH GULF OF MEXICO[a]

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS PROJECT, PASCAGOULA, MISSISSIPPI (APRIL 2010)

		USEPA-REGION 4 BACKGROUND CONCENTRATION - NORTH GULF OF MEXICO[a]		REFERENCE SITE B		BCW-02		BCW-06		PLS-03/04	
ANALYTE[b]	**UNITS**	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***	***Nereis virens***	***Macoma nasuta***
ARSENIC	MG/KG	7.4 to 37.0	3.4 to 5.4	2.2	2.42	--	--	--	2.82	--	--
COPPER	MG/KG	2.3 to 5.3	0.58 to 2.8	1.22	2.12	1.54	--	1.36	--	--	--
LEAD	MG/KG	0.31 to 1.2	<0.47	0.11	0.326	--	--	--	--	--	**0.746**
DIOXIN TEQ (ND=RL)	NG/KG	0.31 to 0.63	0.16-0.19	**9.26**	**11.4**	--	--	**5.34**	**11.3**	--	--

[a]*Source:* Southeast Regional Implementation Manual (SERIM), USACE/USEPA 2008

[b]Values provided only for metal and dioxin constituents that were tested in this program and stastically exceeded the reference site concentration.

NOTE: Bold and shaded concentrations exceed background concentrations

Metals were not sampled and no dioxin TEQs statistically exceeded reference site concentrations at locations BCW-05 or PLS-01/02.

ND = not detected or was detected below the reporting limit.

MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT (MPRSA) SECTION 103 EVALUATION

Appendix A

BATHYMETRIC SURVEYS BAYOU CASOTTE AND THE PASCAGOULA LOWER SOUND, PASCAGOULA, MISSISSIPPI

Submitted by:
U.S. Army Corps of Engineers
Mobile District
109 St. Joseph Street
Mobile, AL 36602

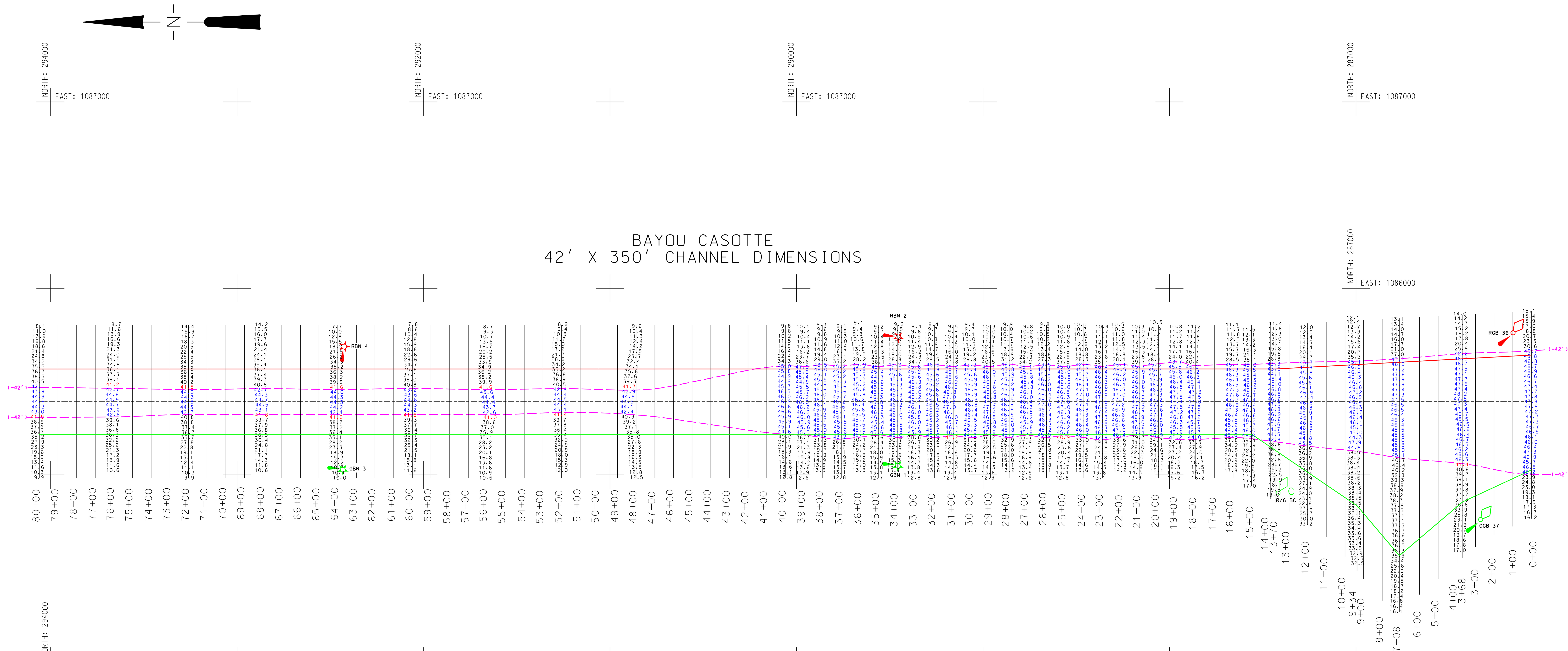
Prepared by:
EA Engineering, Science, and Technology
15 Loveton Circle
Sparks, Maryland 21152

MARCH 2011

BAYOU CASOTTE

US Army Corps of Engineers
Mobile District

BAYOU CASOTTE
42' X 350' CHANNEL DIMENSIONS



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LEGEND

- GREEN DAY MARKER
- RED DAY MARKER
- GREEN BEACON
- RED BEACON
- GREEN GAS BUOY
- RED GAS BUOY
- GREEN CAN BUOY
- RED CAN BUOY
- RED NUN BUOY
- GREEN NUN BUOY
- PILING
- MOORING DOLPHIN
- MOORING CELL
- RANGE
- TIDE GAGE
- SUNKEN VESSEL
- CHANNEL OBSTRUCTION

SCALE 1"=300'
300' 0 300' 600'

NOTES:

1. ALL ELEVATIONS SHOWN ARE REFERENCED TO MEAN LOWER LOW WATER. (M.L.L.W.)
2. COORDINATES ARE REFERENCED TO MISSISSIPPI STATE PLANE COORDINATE SYSTEM 83 DATUM EAST ZONE.
3. SURVEYED BY: N. STAFFORD & J. FREEMAN
4. SURVEY VESSEL: JERRY WALLACE
5. TIDE: -0.20 THRU +0.40
6. SURVEY DATE: 02/17/11
7. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THE TIME.
8. FREQUENCY SOUNDINGS: 208 KHz.

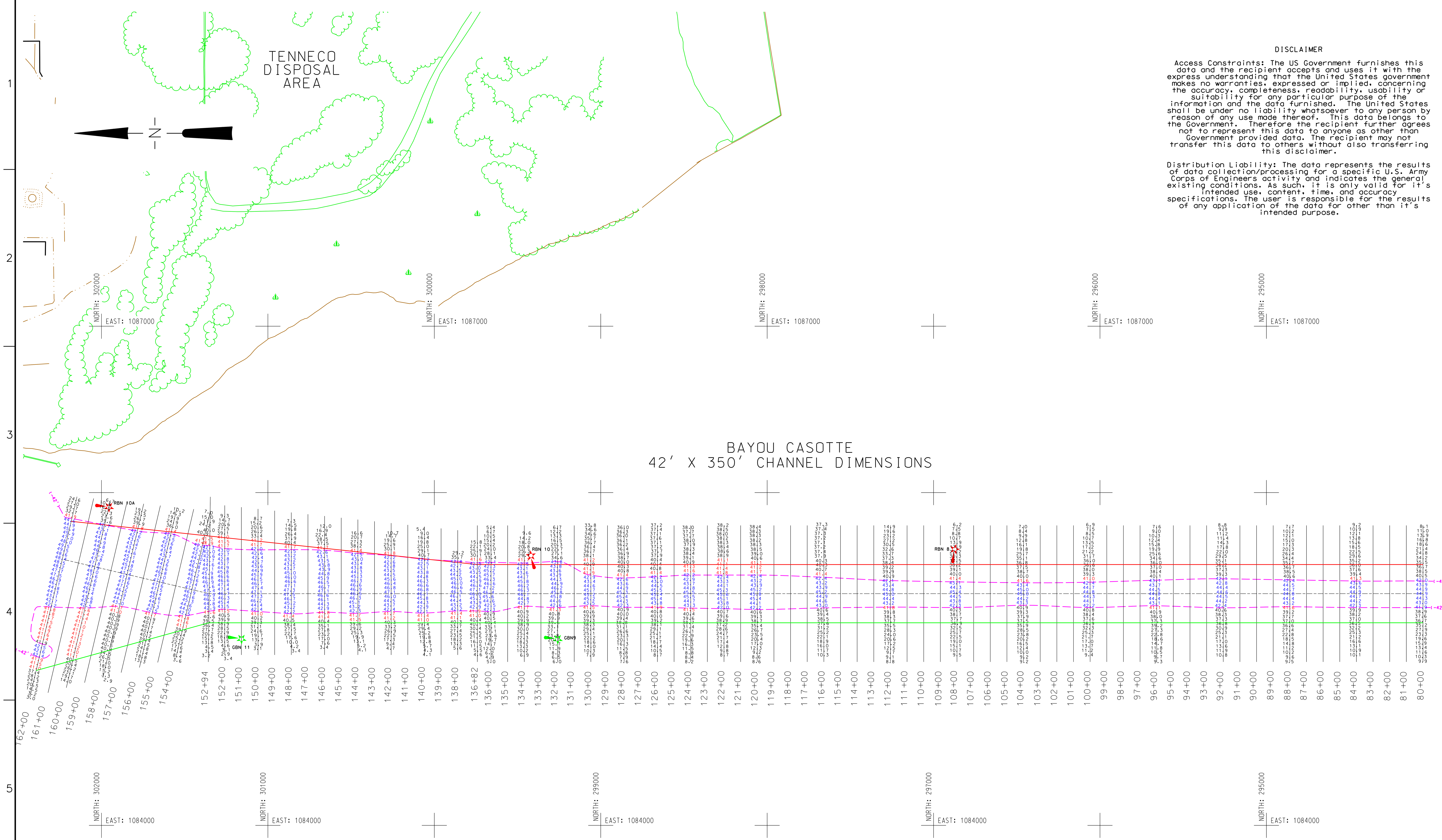
Symbol	Description	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA

Designed By: J. GIBSON
Drawn By: J. GIBSON
Checked By:
Reviewed By:
Date: FEB. 18, 2011
File No. BCP021711C BCP021711A
I.S.O. Sheet File Name: BCP021711A.DGN
Solicitation Number: BCP021711C

PASCAGOULA HARBOR, MISSISSIPPI
BAYOU CASOTTE
STA.0+00-80+00
CONDITION SURVEY

Sheet Reference Number:
1 OF 3



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LEGEND

- GREEN DAY MARKER
- RED DAY MARKER
- GREEN BEACON
- RED BEACON
- GREEN GAS BUOY
- RED GAS BUOY
- GREEN CAN BUOY
- RED CAN BUOY
- RED NUN BUOY
- GREEN NUN BUOY
- PILING
- MOORING DOLPHIN
- MOORING CELL
- RANGE
- TIDE GAGE
- SUNKEN VESSEL
- CHANNEL OBSTRUCTION

SCALE 1"=300'

300' 0 300' 600'

NOTES:

1. ALL ELEVATIONS SHOWN ARE REFERENCED TO MEAN LOWER LOW WATER. (M.L.L.W.)
2. COORDINATES ARE REFERENCED TO MISSISSIPPI STATE PLANE COORDINATE SYSTEM 83 DATUM EAST ZONE.
3. SURVEYED BY: D. CARTER, J. FREEMAN & N. STAFFORD
4. SURVEY VESSEL: JERRY WALLACE
5. SURVEY DATE: 02/09/11 TIDE: 0.00 THRU +0.60
   SURVEY DATE: 02/17/11 TIDE: -0.20 THRU +0.40
6. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THE TIME.
7. FREQUENCY SOUNDINGS: 208 KHz.

US Army Corps of Engineers
Mobile District

Symbol | Description | Date | Approved

Date: FEB. 18, 2011
File No.: BCP02171IC BCP02081IB
I.S.O. Sheet File Name: BCP021711B.DGN
Solicitation Number: BCP021711C

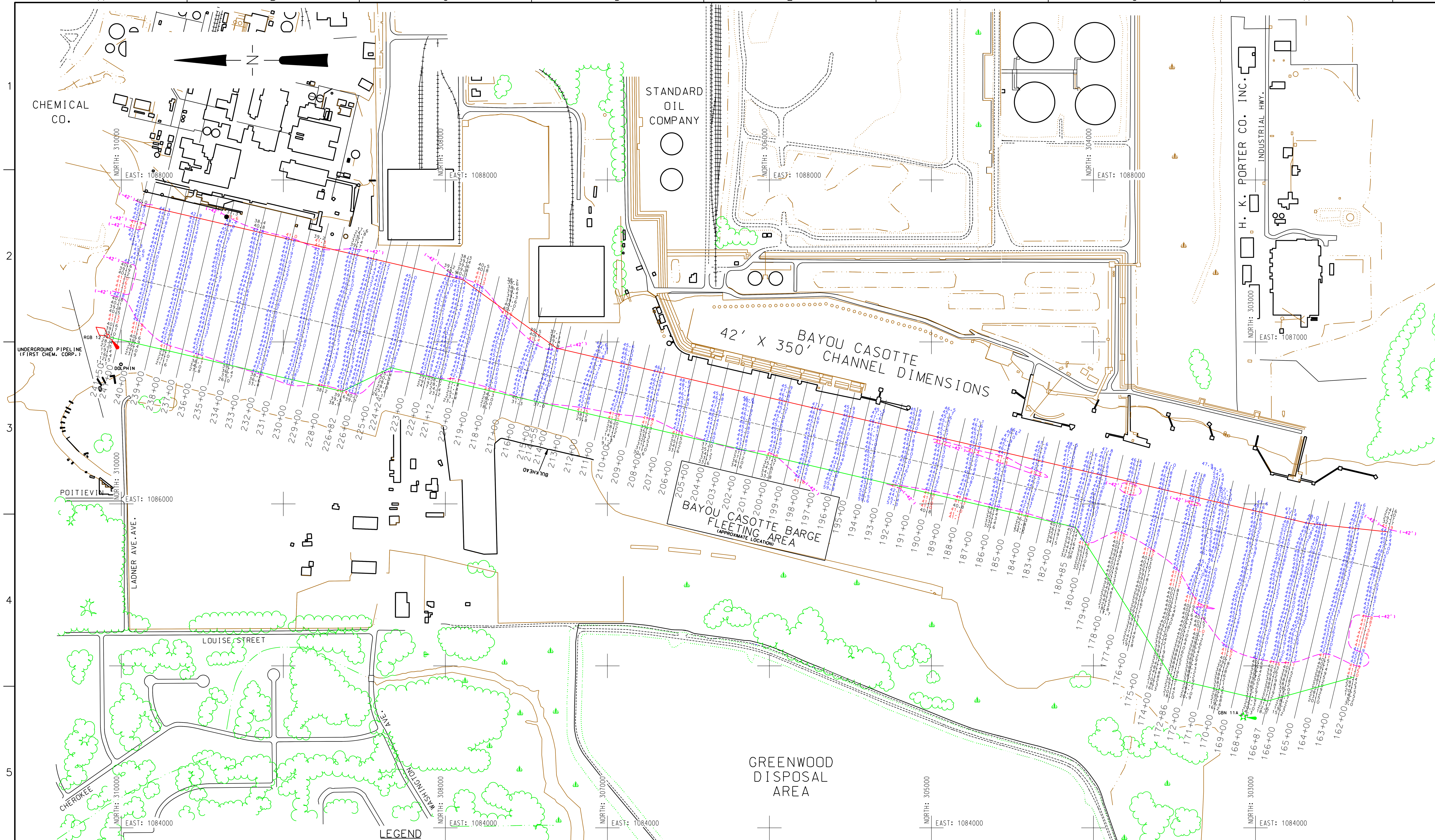
Designed By: J. GIBSON
Drawn By: J. GIBSON
Checked By:
Reviewed By:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA

PASCAGOULA HARBOR, MISSISSIPPI

BAYOU CASOTTE
STA.80+00-162+00
CONDITION SURVEY

Sheet Reference Number:
2 OF 3



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US Army Corps of Engineers
Mobile District

Symbol	Description	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA

Designed By: J. GIBSON	Date: FEB. 18, 2011
Drawn By: J. GIBSON	File No. BCB021711C BCB020811B
Checked By:	I.S.O. Sheet File Name: BCB021711C.DGN
Reviewed By:	Solicitation Number: BCB021711C

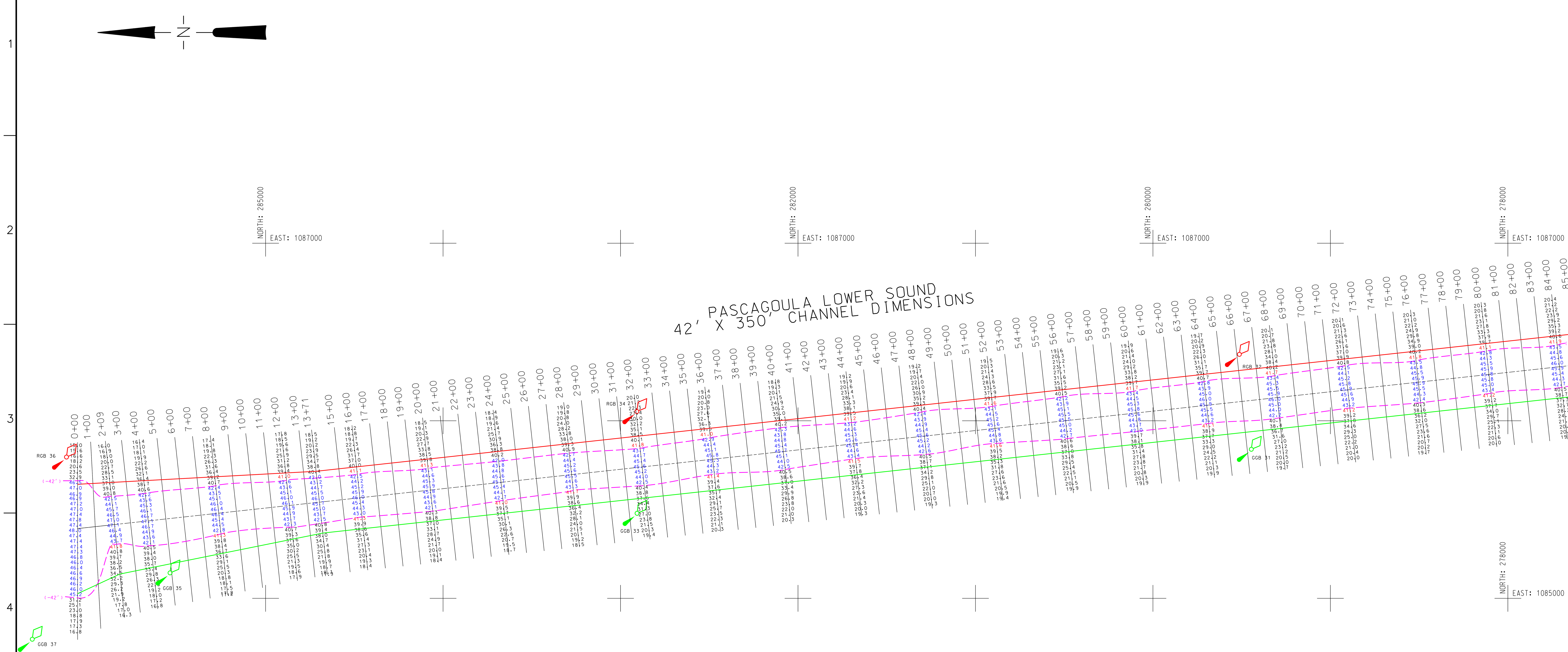
PASCAGOULA HARBOR, MISSISSIPPI

BAYOU CASOTTE STA.162+00-241+50 CONDITION SURVEY

Sheet Reference Number:

3 OF 3

PASCAGOULA LOWER SOUND



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SCALE 1"=300'

300' 0 300' 600'

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3. SURVEYED BY: D. CARTER
4. SURVEY VESSEL: JERRY WALLACE
5. TIDE: +0.90 THRU +1.20
6. SURVEY DATE: 2/22/11
7. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THE TIME.
8. FREQUENCY SOUNDINGS: 200 KHz.

US Army Corps of Engineers
Mobile District

Symbol	Description	Date	Approved

Date: FEB. 23, 2011
File No. PL022211C
I.S.O. Sheet File Name: PL022211A.DGN
Solicitation Number: PL022211C

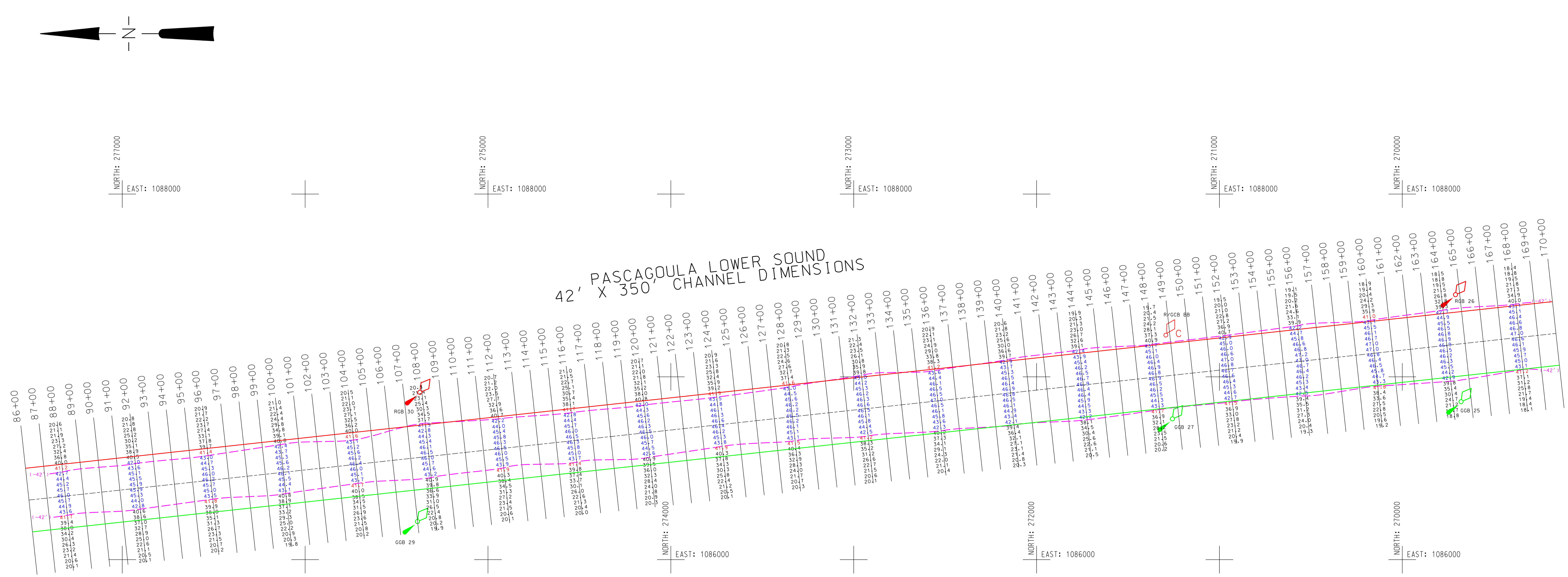
Designed By: J. SMITH
Drawn By: J. SMITH
Checked By:
Reviewed By:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA

PASCAGOULA HARBOR, MISSISSIPPI

PASCAGOULA LOWER SOUND
STA.0+00-85+00
CONDITION SURVEY

Sheet Reference Number:
1 OF 3



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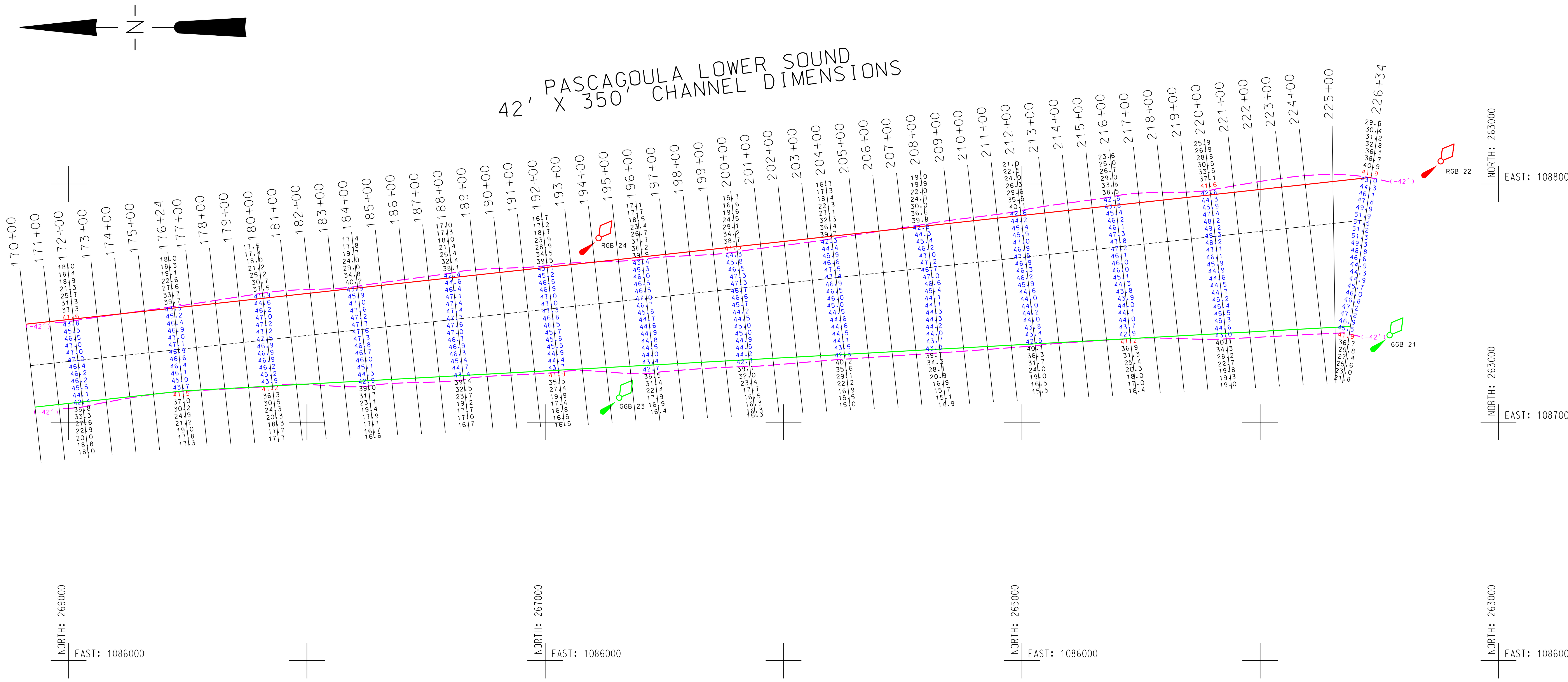
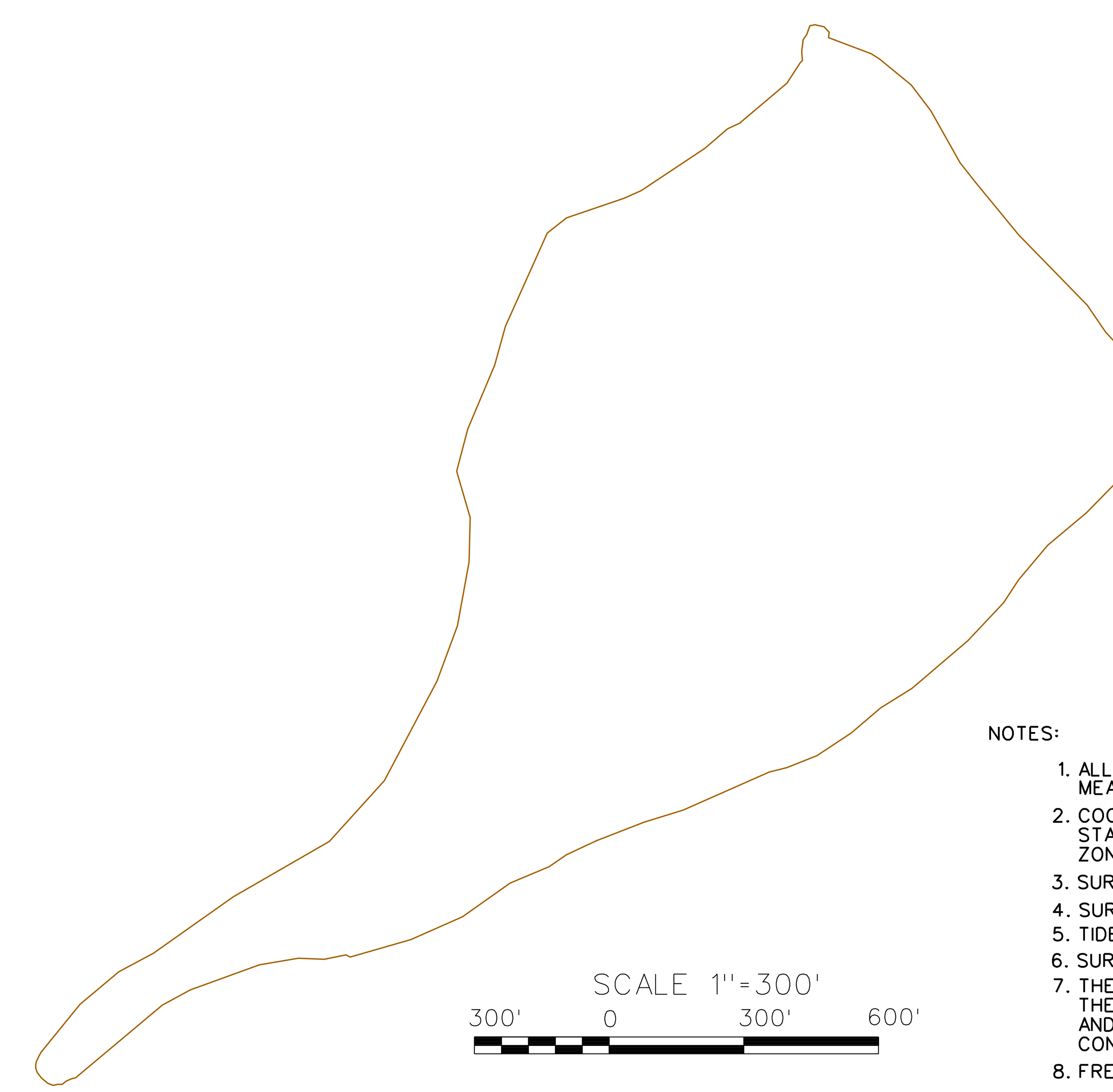
CORPS OF ENGINEERS
MOBILE, ALABAMA

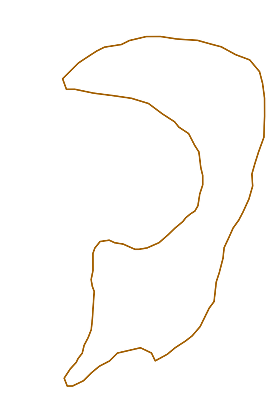
PASCAGOULA HARBOR, MISSISSIPPI

PASCAGOULA LOWER SOUND
STA.85+00-170+00
CONDITION SURVEY

Sheet Reference Number:
2 OF 3







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U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA

PASCAGOULA HARBOR, MISSISSIPPI

PASCAGOULA LOWER SOUND
STA.170+00-226+34
CONDITION SURVEY

Sheet Reference Number:

MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT (MPRSA) SECTION 103 EVALUATION

Attachment I

STFATE MODEL RESULTS BAYOU CASOTTE AND THE PASCAGOULA LOWER SOUND, PASCAGOULA, MISSISSIPPI

Submitted by:
U.S. Army Corps of Engineers
Mobile District
109 St. Joseph Street
Mobile, AL 36602

Prepared by:
EA Engineering, Science, and Technology
15 Loveton Circle
Sparks, Maryland 21152

MARCH 2011

BAYOU CASOTTE

Summary of STFATE Modeling for Placement of Bayou Casotte (Widening) Dredge Material into the Pascagoula ODMDS

Placement Volume (cuy)	1-hr		4-hrs		Tier II WQ Violation	TIER III EC_{50} Violation
	Dilution Factor	Feet Traveled	Dilution Factor	Feet Traveled		
4000	9	224	318	1,914	No	No
8000	6	364	186	1,914	No	No
9,000	6	364	170	1,914	No	**Yes**

Pascagoula ODMDS: Zone A

INPUT PARAMETER	UNITS	VALUE

SITE DESCRIPTION

Number of grid points (L-R, +z dir)		96
Number of grid points (T-B, +x dir)		96
Grid spacing (Left to Right) Z-Axis	ft	150
Grid spacing (Top to Bottom) X-Axis	ft	150
Constant water depth	ft	44
Bottom roughness	ft	0.005
Bottom slope (x-dir)	deg	0
Bottom slope (z-dir)	deg	0
Number of points in density profile		2
0 ft	g/cc	1.0174
44 ft	g/cc	1.0230

AMBIENT VELOCITY

Type of velocity profile		2-Point at constant depth
Depth ft	Velocity X (fps)	Velocity Z (fps)
10	-0.232	-0.232
40	-0.116	0.116

DISPOSAL OPERATION

Disposal point top of grid (X-Axis)	ft	8,500
Disposal point left edge of grid (Z-Axis)	ft	8,200
Dumpint Over Depression		No
Bottom depression length x-direction	ft	0
Bottom depression length z-direction	ft	0
Bottom depression average depth	ft	0
Location of Disposal Site		
Upper Left Corner Distance from Top Edge (X)	ft	1,000
Uper Left Corner Distance from Left Edge (Z)	ft	1,000
Lower Right Corner Distance from Top Edge (X)	ft	14,000
Lower Right Corner Distance from Left Edge (Z)	ft	14,000
Length of vessel bin	ft	309
Width of vessel bin	ft	78
Distance Between Bins	ft	5
Predisposal draft	ft	20
Postdisposal draft	ft	10
Time to empty vessel	s	90
Number of Bins that Open Simultaneously	s	1
Number of Discrete Openings of Sets of Bins	s	1
Vessel velocity in x-direction	ft/s	1.7
Vessel velocity in z-direction	ft/s	0
Number of layers		1
Volume of each layer	yd^3	

COEFFICIENTS

Settling coef (BETA)		0
Apparent mass coefficient (CM)		1
Drag coefficient (CD)		0.5
Form drag collapse cloud (CDRAG)		1
Skin friction collapse cloud (CFRIC)		0.01
Drag ellipse wedge (CD3)		0.1
Drag plate (CD4)		1
Friction between cloud and bottom (FRICTN)		0.01
4/3 Law horizontal diffusion coefficient (ALAMDA)		0.001
Unstratified vertical diffusion coefficient (AKY0)		0.025
Cloud/ambient density gradient ratio (GAMA)		0.25
Turbulent thermal entrainment (ALPHA0)		0.235
Entrainment collapse (ALPHAC)		0.1
Stripping factor (CSTRIP)		0.003

INPUT, EXECUTION & OUTPUT KEYS

Process to simulate		Disp. from Split-Hull Barge/Scow
Duration of simulation	s	14,400
Long Term Time Step	s	600
Convective descent output		
Collapse phase output option		
Number of print times for diffusion		
Number of depths for output		4
Depths for output	ft	0, 25, 50, 75

Dredge Material

Location		Bayou Casotte Channel (Widening)

Water Quality - Tier II

Contaminant		Ammonia
Predicted initial concentration in fluid	mg/L	25.2
Acute Water Quality Criteria at Edge of Mixing Zone	mg/L	5.83
Chronic Water Quality Criteria at Edge of Mixing Zone	mg/L	0.875
Background concentration	mg/L	0.33

Toxicity - Tier III

EC50	% Elutriate	57.9
0.01 EC50	% Elutriate	0.579

BAYOU CASOTTE

Tier 2 Chronic Water Quality Run

Chronic Water Quality Criteria = 0.875 mg/L
Placement Volume = 4,000 cubic yards

HOPPER DISCHARGE FOR PASCAGOULA SOUND ODMDS

□□

MODEL: SHORT-TERM FATE OF DREDGED MATERIAL FROM SPLIT HULL BARGE OR HOPPER DREDGE
(PC Version 5.01 MAY, 1993)
(Extended Memory Modification: December, 1997)
This Version Supports Grid Sizes up to 96 x 96 Points

TITLE: HOPPER DISCHARGE FOR PASCAGOULA SOUND ODMDS

FILE: TmpFile .DUE

AREA: THE PROJECT AREA IS DESCRIBED BY A 96 X 96 GRID.

THERE ARE 96 GRID POINTS (NMAX) IN THE Z-DIRECTION (FROM LEFT TO RIGHT)
AND 96 GRID POINTS (MMAX) IN THE X-DIRECTION (FROM TOP TO BOTTOM).

SITE: THE DISPOSAL SITE IS REPRESENTED AS A RECTANGLE ON THE SITE GRID.

THE TOPMOST BOUNDARY IS LOCATED AT POINT # 8 (MDS1) FROM THE TOP OF THE GRID.

THE BOTTOMMOST BOUNDARY IS LOCATED AT POINT #94 (MDS2) FROM THE TOP OF THE GRID.

THE LEFTMOST BOUNDARY IS LOCATED AT POINT # 8 (NDS1) FROM THE LEFT OF THE GRID.

THE RIGHTMOST BOUNDARY IS LOCATED AT POINT #94 (NDS2) FROM THE LEFT OF THE GRID.

EXECUTION PARAMETERS:

MODEL COEFFICIENTS SPECIFIED IN INPUT DATA (KEY1 = 1).

PERFORM COMPLETE ANALYSIS INCLUDING DESCENT, COLLAPSE, AND TRANSPORT-DIFFUSION (KEY2 = 0).

PERFORM TIER II OCEAN DUMPING INITIAL MIXING EVALUATION
TO COMPARE WATER QUALITY WITH CRITERIA (KEY3 = 2).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF DYNAMIC COLLAPSE RESULTS NOT REQUESTED (IPCL = 0).

QUARTERLY PRINTING OF LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED (IPLT = 0).

LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED AT THE FOLLOWING 4 DEPTH(S):

0.00 FT
15.00 FT
30.00 FT
45.00 FT

GRID: NUMBER OF LONG TERM GRID POINTS IN Z-DIRECTION (NMAX) = 96

NUMBER OF LONG TERM GRID POINTS IN X-DIRECTION (MMAX) = 96

GRID SPACING IN Z-DIRECTION (DZ) = 150.00000 FT

GRID SPACING IN X-DIRECTION (DX) = 150.00000 FT

CONSTANT DEPTH GRID SPECIFIED HAVING A DEPTH (DEPC) OF 44.00000 FT.

DEPTH GRID, FEET:

M N =	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
2	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
3	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
4	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
5	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
6	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
7	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
8	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
9	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.

RESULT: THE WATER QUALITY CRITERIA FOR THE DISPOSAL SITE WAS NOT VIOLATED.

*** RUN COMPLETED ***

BAYOU CASOTTE

Tier 3 Water Column Bioassay Run

EC_{50} = 57.9 Percent Elutriate
Placement Volume = 4,000 cubic yards

HOPPER DISCHARGE FOR PASCAGOULA SOUND ODMDS

□□

MODEL: SHORT-TERM FATE OF DREDGED MATERIAL FROM SPLIT HULL BARGE OR HOPPER DREDGE
(PC Version 5.01 MAY, 1993)
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This Version Supports Grid Sizes up to 96 x 96 Points

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THE BOTTOMMOST BOUNDARY IS LOCATED AT POINT #94 (MDS2) FROM THE TOP OF THE GRID.

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EXECUTION PARAMETERS:

MODEL COEFFICIENTS SPECIFIED IN INPUT DATA (KEY1 = 1).

PERFORM COMPLETE ANALYSIS INCLUDING DESCENT, COLLAPSE, AND TRANSPORT-DIFFUSION (KEY2 = 0).

PERFORM TIER III OCEAN DUMPING INITIAL MIXING EVALUATION
TO COMPARE WITH TOXICITY CRITERIA (KEY3 = 3).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF DYNAMIC COLLAPSE RESULTS NOT REQUESTED (IPCL = 0).

QUARTERLY PRINTING OF LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED (IPLT = 0).

LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED AT THE FOLLOWING 4 DEPTH(S):

0.00 FT
15.00 FT
30.00 FT
45.00 FT

GRID: NUMBER OF LONG TERM GRID POINTS IN Z-DIRECTION (NMAX) = 96

NUMBER OF LONG TERM GRID POINTS IN X-DIRECTION (MMAX) = 96

GRID SPACING IN Z-DIRECTION (DZ) = 150.00000 FT

GRID SPACING IN X-DIRECTION (DX) = 150.00000 FT

CONSTANT DEPTH GRID SPECIFIED HAVING A DEPTH (DEPC) OF 44.00000 FT.

DEPTH GRID, FEET:

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2	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
3	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
4	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
5	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
6	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
7	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
8	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
9	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.

RESULT: THE TOXICITY CRITERIA FOR THE DISPOSAL SITE WAS NOT VIOLATED.

*** RUN COMPLETED ***

PASCAGOULA LOWER SOUND

Summary of STFATE Modeling for Placement of Pascagoula Lower Sound Material into the Pascagoula ODMDS

Placement Volume (cuy)	1-hr		4-hrs		Tier II WQ Violation	TIER III EC_{50} Violation
	Dilution Factor	Feet Traveled	Dilution Factor	Feet Traveled		
4,000	11	224	415	1,914	No	No
8,000	8	364	242	1,914	No	No
12,000	7	364	179	1,914	No	No
14,000	6	364	160	2,030	No	No
15,000	6	430	152	2,030	No	**Yes**

Pascagoula ODMDS: Zone A

INPUT PARAMETER	UNITS	VALUE

SITE DESCRIPTION

Number of grid points (L-R, +z dir)		96
Number of grid points (T-B, +x dir)		96
Grid spacing (Left to Right) Z-Axis	ft	150
Grid spacing (Top to Bottom) X-Axis	ft	150
Constant water depth	ft	44
Bottom roughness	ft	0.005
Bottom slope (x-dir)	deg	0
Bottom slope (z-dir)	deg	0
Number of points in density profile		2
0	g/cc	1.0174
44	g/cc	1.0230

AMBIENT VELOCITY

Type of velocity profile		2-Point at constant depth
Depth ft	Velocity X (fps)	Velocity Z (fps)
10	-0.232	-0.232
40	-0.116	0.116

DISPOSAL OPERATION

Disposal point top of grid (X-Axis)	ft	8,500
Disposal point left edge of grid (Z-axis)	ft	8,200
Dumpint Over Depression		No
Bottom depression length x-direction	ft	0
Bottom depression length z-direction	ft	0
Bottom depression average depth	ft	0
Location of Disposal Site		
Upper Left Corner Distance from Top Edge (X)	ft	1,000
Uper Left Corner Distance from Left Edge (Z)	ft	1,000
Lower Right Corner Distance from Top Edge (X)	ft	14,000
Lower Right Corner Distance from Left Edge (Z)	ft	14,000
Length of vessel bin	ft	309
Width of vessel bin	ft	78
Distance Between Bins	ft	5
Predisposal draft	ft	20
Postdisposal draft	ft	10
Time to empty vessel	s	90
Number of Bins that Open Simultaneously	s	1
Number of Discrete Openings of Sets of Bins	s	1
Vessel velocity in x-direction	ft/s	1.7
Vessel velocity in z-direction	ft/s	0
Number of layers		1
Volume of each layer	yd^3	4,000

COEFFICIENTS

Settling coef (BETA)		0
Apparent mass coefficient (CM)		1
Drag coefficient (CD)		0.5
Form drag collapse cloud (CDRAG)		1
Skin friction collapse cloud (CFRIC)		0.01
Drag ellipse wedge (CD3)		0.1
Drag plate (CD4)		1
Friction between cloud and bottom (FRICTN)		0.01
4/3 Law horizontal diffusion coefficient (ALAMDA)		0.001
Unstratified vertical diffusion coefficient (AKY0)		0.025
Cloud/ambient density gradient ratio (GAMA)		0.25
Turbulent thermal entrainment (ALPHA0)		0.235
Entrainment collapse (ALPHAC)		0.1
Stripping factor (CSTRIP)		0.003

INPUT, EXECUTION & OUTPUT KEYS

Process to simulate		Disp. from Split-Hull Barge/Scow
Duration of simulation	s	14,400
Long Term Time Step	s	600
Convective descent output		
Collapse phase output option		
Number of print times for diffusion		
Number of depths for output		4
Depths for output	ft	0, 25, 50, 75

Dredge Material

Location		Pascagoula Lower Sound

Water Quality - Tier II

Contaminant		Ammonia
Predicted initial concentration in fluid	mg/L	20.5
Acute Water Quality Criteria at Edge of Mixing Zone	mg/L	3.68
Chronic Water Quality Criteria at Edge of Mixing Zone	mg/L	0.553
Background concentration	mg/L	0.3
Required Dilution		81

Toxicity - Tier III

EC50	% Elutriate	62.5
0.01 EC50	% Elutriate	0.625
Required Dilution		160

PASCAGOULA LOWER SOUND

Tier 2 Chronic Water Quality Run

Chronic Water Quality Criteria = 0.553 mg/L
Placement Volume = 4,000 cubic yards

HOPPER DISCHARGE FOR PASCAGOULA SOUND ODMDS

MODEL: SHORT-TERM FATE OF DREDGED MATERIAL FROM SPLIT HULL BARGE OR HOPPER DREDGE
(PC Version 5.01 MAY, 1993)
(Extended Memory Modification: December, 1997)
This Version Supports Grid Sizes up to 96 x 96 Points

TITLE: HOPPER DISCHARGE FOR PASCAGOULA SOUND ODMDS

FILE: TmpFile .DUE

AREA: THE PROJECT AREA IS DESCRIBED BY A 96 X 96 GRID.

THERE ARE 96 GRID POINTS (NMAX) IN THE Z-DIRECTION (FROM LEFT TO RIGHT) AND 96 GRID POINTS (MMAX) IN THE X-DIRECTION (FROM TOP TO BOTTOM).

SITE: THE DISPOSAL SITE IS REPRESENTED AS A RECTANGLE ON THE SITE GRID.

THE TOPMOST BOUNDARY IS LOCATED AT POINT #14 (MDS1) FROM THE TOP OF THE GRID.

THE BOTTOMMOST BOUNDARY IS LOCATED AT POINT #94 (MDS2) FROM THE TOP OF THE GRID.

THE LEFTMOST BOUNDARY IS LOCATED AT POINT #14 (NDS1) FROM THE LEFT OF THE GRID.

THE RIGHTMOST BOUNDARY IS LOCATED AT POINT #94 (NDS2) FROM THE LEFT OF THE GRID.

EXECUTION PARAMETERS:

MODEL COEFFICIENTS SPECIFIED IN INPUT DATA (KEY1 = 1).

PERFORM COMPLETE ANALYSIS INCLUDING DESCENT, COLLAPSE, AND TRANSPORT-DIFFUSION (KEY2 = 0).

PERFORM TIER II OCEAN DUMPING INITIAL MIXING EVALUATION TO COMPARE WATER QUALITY WITH CRITERIA (KEY3 = 2).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF DYNAMIC COLLAPSE RESULTS NOT REQUESTED (IPCL = 0).

QUARTERLY PRINTING OF LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED (IPLT = 0).

LONG-TERM TRANSPORT DIFFUSION RESULTS REQUESTED AT THE FOLLOWING 4 DEPTH(S):

0.00 FT
15.00 FT
30.00 FT
45.00 FT

GRID: NUMBER OF LONG TERM GRID POINTS IN Z-DIRECTION (NMAX) = 96

NUMBER OF LONG TERM GRID POINTS IN X-DIRECTION (MMAX) = 96

GRID SPACING IN Z-DIRECTION (DZ) = 150.00000 FT

GRID SPACING IN X-DIRECTION (DX) = 150.00000 FT

CONSTANT DEPTH GRID SPECIFIED HAVING A DEPTH (DEPC) OF 44.00000 FT.

DEPTH GRID, FEET:

M N =	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
2	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
3	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
4	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
5	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
6	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
7	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
8	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
9	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
10	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
11	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
12	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
13	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
14	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
15	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
16	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
17	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
18	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
19	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.

```
0.000E+00        0.300E+00
          2.17       34.8         0.710E+00      0.101E+01     7800.     9000.
0.000E+00        0.300E+00
          2.33       34.8         0.586E+00      0.886E+00     7800.     9000.
0.000E+00        0.300E+00
          2.50       34.8         0.492E+00      0.792E+00     7650.     9150.
0.000E+00        0.300E+00
          2.67       34.8         0.418E+00      0.718E+00     7650.     9150.
0.000E+00        0.300E+00
          2.83       34.8         0.358E+00      0.658E+00     7500.     9150.
0.000E+00        0.300E+00
          3.00       34.8         0.302E+00      0.602E+00     7500.     9300.
0.000E+00        0.300E+00
          3.17       34.8         0.265E+00      0.565E+00     7350.     9300.
0.000E+00        0.300E+00
          3.33       34.8         0.228E+00      0.528E+00     7350.     9300.
0.000E+00        0.300E+00
          3.50       34.8         0.199E+00      0.499E+00     7200.     9300.
0.000E+00        0.300E+00
          3.67       34.8         0.173E+00      0.473E+00     7050.     9450.
0.000E+00        0.300E+00
          3.83       34.8         0.153E+00      0.453E+00     7050.     9450.
0.000E+00        0.300E+00
          4.00       34.8         0.135E+00      0.435E+00     6900.     9450.
0.000E+00        0.300E+00
```

RESULT: THE WATER QUALITY CRITERIA FOR THE DISPOSAL SITE WAS NOT VIOLATED.

*** RUN COMPLETED ***

PASCAGOULA LOWER SOUND

Tier 3 Water Column Bioassay Run

Lowest EC_{50} = 62.5 Percent Elutriate
Placement Volume = 4,000 cubic yards

HOPPER DISCHARGE FOR PASCAGOULA SOUND ODMDS

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(PC Version 5.01 MAY, 1993)
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This Version Supports Grid Sizes up to 96 x 96 Points

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THE LEFTMOST BOUNDARY IS LOCATED AT POINT #14 (NDS1) FROM THE LEFT OF THE GRID.

THE RIGHTMOST BOUNDARY IS LOCATED AT POINT #94 (NDS2) FROM THE LEFT OF THE GRID.

EXECUTION PARAMETERS:

MODEL COEFFICIENTS SPECIFIED IN INPUT DATA (KEY1 = 1).

PERFORM COMPLETE ANALYSIS INCLUDING DESCENT, COLLAPSE, AND TRANSPORT-DIFFUSION (KEY2 = 0).

PERFORM TIER III OCEAN DUMPING INITIAL MIXING EVALUATION
TO COMPARE WITH TOXICITY CRITERIA (KEY3 = 3).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF CONVECTIVE DESCENT RESULTS NOT REQUESTED (IPCN = 0).

PRINTING OF DYNAMIC COLLAPSE RESULTS NOT REQUESTED (IPCL = 0).

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30.00 FT
45.00 FT

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2	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
3	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
4	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
5	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
6	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
7	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
8	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
9	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
10	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
11	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
12	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
13	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
14	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
15	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
16	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
17	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
18	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.
19	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.	44.

0.33	35.7	0.404E+02	8550.	8250.	0.000E+00
0.50	35.7	0.267E+02	8550.	8250.	0.000E+00
0.67	35.7	0.170E+02	8550.	8400.	0.000E+00
0.83	35.7	0.120E+02	8400.	8400.	0.000E+00
1.00	35.7	0.913E+01	8400.	8400.	0.000E+00
1.17	35.7	0.650E+01	8400.	8550.	0.000E+00
1.33	35.7	0.501E+01	8250.	8550.	0.000E+00
1.50	35.7	0.371E+01	8250.	8700.	0.000E+00
1.67	35.7	0.294E+01	8100.	8700.	0.000E+00
1.83	35.7	0.229E+01	8100.	8700.	0.000E+00
2.00	35.7	0.183E+01	7950.	8850.	0.000E+00
2.17	35.7	0.150E+01	7950.	8850.	0.000E+00
2.33	35.7	0.120E+01	7800.	9000.	0.000E+00
2.50	35.7	0.101E+01	7800.	9000.	0.000E+00
2.67	35.7	0.815E+00	7650.	9000.	0.000E+00
2.83	35.7	0.703E+00	7650.	9150.	0.000E+00
3.00	35.7	0.585E+00	7500.	9150.	0.000E+00
3.17	35.7	0.499E+00	7500.	9300.	0.000E+00
3.33	35.7	0.426E+00	7350.	9300.	0.000E+00
3.50	35.7	0.369E+00	7350.	9300.	0.000E+00
3.67	35.7	0.315E+00	7200.	9300.	0.000E+00
3.83	35.7	0.277E+00	7200.	9450.	0.000E+00
4.00	35.7	0.241E+00	7050.	9450.	0.000E+00

RESULT: THE TOXICITY CRITERIA FOR THE DISPOSAL SITE WAS NOT VIOLATED.

*** RUN COMPLETED ***

EVALUATION OF DREDGED MATERIAL

PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENT PROJECT
and the
PASCAGOULA BAR CHANNEL

PASCAGOULA, JACKSON COUNTY, MISSISSIPPI

Sampling and Analysis Plan

Prepared for

Department of the Army
U.S. Army Corps of Engineers
Mobile District
109 St. Joseph Street
Mobile, AL 36602

Prepared by

EA Engineering, Science, and Technology, Inc.
15 Loveton Circle
Sparks, Maryland 21152

April 2010

GROUP A – PROJECT MANAGEMENT

1.0 ELEMENT A1 – TITLE AND APPROVAL SHEET

Title: EVALUATION OF DREDGED MATERIAL: PASCAGOULA HARBOR NAVIGATION CHANNEL IMPROVEMENTS and the PASCAGOULA BAR CHANNEL PASCAGOULA, JACKSON COUNTY, MISSISSIPPI

Organization/Applicant: U.S. Army Corps of Engineers (USACE), Mobile District

Contract Manager: Jennifer Jacobson

Signature:____ Date:_________________________________

Technical Leads (if applicable): Elizabeth Godsey

Signature:____ Date:_________________________________

Signature:____ Date:_________________________________

Regulatory Agency: USEPA-Region IV

Project Manager: Doug Johnson

Signature:____ Date:_________________________________

QA Manager: Chris McArthur or Gary Collins

Signature: ____________________________________ Date:_________________________________

Contractor: EA Engineering, Science, and Technology, Inc.

Project Manager: Peggy Derrick

Signature:____ Date:_________________________________

QA Officer: Christine Papageorgis, PhD.

Signature:____ Date:_________________________________

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ATTACHMENTS

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ATTACHMENT II	**SITE SAFETY AND HEALTH PLAN (SSHP)**

3.0 ELEMENT A3 – DISTRIBUTION LIST

This document is to be distributed to the following individuals for review and approval prior to the start of sampling activities:

1. USACE Project Manager: Kelly McElhenney
2. USACE QA/QC Manager: Elizabeth Godsey
3. USEPA Project Manager: Doug Johnson
4. USEPA QA/QC Manager: Chris McArthur or Gary Collins
5. Contractor Project Manager: Peggy Derrick
6. Contractor QA/QC Manager: Christine Papageorgis, PhD.

4.0 ELEMENT A4 – PROJECT/TASK ORGANIZATION

This Sampling and Analysis Plan documents the activities and protocols associated with the Evaluation of Dredged Material for the Navigation Channel Improvements in Pascagoula Harbor, Mississippi as well as sampling performed in the Pascagoula Bar Channel to support maintenance dredging. An Ecotoxicology Quality Assurance Project Plan (Eco-QAPP) and the Site Safety and Health Plan (SSHP) are provided in Attachments I and II, respectively. The SAP was prepared in accordance with the Southeast Regional Implementation Manual (SERIM) (USACE/USEPA 2008). The Site Safety and Health Plan was prepared in accordance with OSHA 29 CFR 1910.120 and Engineer Manual (EM) 385-1-1 (15 September 2008).

The successful completion of the projects relies on open lines of communication between the client, contractor, regulatory agencies, laboratories, and subcontractors. This communication and successful completion of the projects must be the contractor’s utmost goal. Contact information will be readily available throughout the life of these projects, from pre-planning to field work, data analysis, data reduction, and reporting. Any questions, clarifications, suggestions, and/or problems will be addressed in a timely manner.

4.1 List of Acronyms

ANOVA	Analysis of Variance
APHA	American Public Health Association
ASPRS	American Society for Photogrammetry and Remote Sensing
ASTM	ASTM International (formerly American Society for Testing and Materials)
AVS	Acid Volatile Sulfides
ºC	Degrees Celsius
CAB	Cellulose acetate butyrate
CADD	Computer Assisted Drafting and Design
CCC	Criteria Continuous Concentration
CD-ROM	Compact Disk Read-Only Memory
CMC	Criterion Maximum Concentration
COC	Chain-of-custody
COPC	Contaminant(s) of Potential Concern
CQAR	Chemical Quality Assurance Report
CSI	Construction Solutions International, Inc.
CV	Calibration Verification
%D	Percent Difference
DBT	Dibutyltin
DGPS	Differential Global Positioning System
DQCR	Daily Quality Control Report
DU	Dredging Unit
EA	EA Engineering, Science and Technology, Inc.
EC50	Median Effective Concentration
EDD	Electronic Data Deliverable
EET	Effluent Elutriate Test
EPA (USEPA)	United States Environmental Protection Agency
EQB	Equipment Blank
ERL	Effects Range-Low
FD	Field Duplicate
FDA (USFDA)	United States Food and Drug Administration
FGDC	Federal Geographic Data Committee
ft	foot (feet)

GC/MS	Gas Chromatography/Mass Spectrometry
GEO	Geotechnical Boring
GIS	Geographic Information System
HCl	Hydrochloric Acid
Hg	Mercury
HMW	High Molecular Weight
HNO_3	Nitric Acid
HPLC	High Performance Liquid Chromatography
ITM	Inland Testing Manual
LAN	Local Area Network
LC50	Median Lethal Concentration
LCS	Laboratory Control Samples
LPC	Limiting Permissible Concentration
LIMS	Laboratory Information Management System
LMW	Low Molecular Weight
MBT	Monobutyltin
MD	Matrix Duplicate
MDL	Method Detection Limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	Milliliter
MLLW	Mean Lower Low Water
MPRSA	Marine Protection, Research, and Sanctuaries Act of 1972
MS	Matrix Spike
MS DEQ	Mississippi Department of Environmental Quality
MSD	Matrix Spikes Duplicate
NaOH	Sodium Hydroxide
NAD	North American Datum
NCM	Nonconformance Memo
ND	Non-detected
NEIC	National Enforcement Investigations Center
ng/L	nanograms per liter
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
O&M	Operation and Maintenance
ODMDS	Ocean Dredged Material Disposal Site
PASC	Pascagoula Harbor
PAH	Polycyclic Aromatic Hydrocarbons
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCB	Polychlorinated Biphenyls
PDF	Portable Document Format
PEL	Probable Effects Level
pg/g	picograms per gram
pg/L	picograms per liter
QA	Quality Assurance
QC	Quality Control
QAM	Quality Assurance Manager
QAM	Quality Assurance Manual

QAP	Quality Assurance Plan
QAPP	Quality Assurance Project Plan
%R	Percent Recovery
RIM	Regional Implementation Manual
RL	Reporting Limit
RPD	Relative Percent Difference
SAD	South Atlantic Division (USACE)
SAP	Sampling and Analysis Plan
SDS	Spatial Data Standards
SED	Sediment
SEM	Simultaneously Extracted Metals
SET	Standard Elutriate
SERIM	Southeast Regional Implementation Manual
SOP	Standard Operating Procedure
SQG	Sediment Quality Guidelines
SRM	Standard Reference Material
SSHP	Site Safety and Health Plan
SVOC	Semivolatile Organic Compounds
SW	Site water
TBT	Tributyltin
TDL	Target Detection Limit
TEF	Toxicity Equivalency Factor
TEL	Threshold Effects Level
TEQ	Toxicity Equivalency Quotient
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TSS	Total Suspended Solids
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmoles/gm	micromoles per gram
UR	Uptake Ratio
USACE	U.S. Army Corps of Engineers
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
USFDA	United States Food and Drug Administration
WQC	Water Quality Criteria

4.2 Dredging Project Proponent

Federal: U.S. Army Corps of Engineers (USACE) – Mobile District
Project Manager: Jenny Jacobson, Chief Coastal Environment Section

Regulatory: USEPA-Region IV

4.3 Dredging Project Team and Responsibilities

The EA project team (Figure 4.1) is organized to provide professional expertise in each of the major components necessary for the completion of the projects. Contact information for key technical staff is provided in Table 4.1. Additional personnel will/may assist with various tasks related to the projects on an as needed basis.

Overall responsibility for ensuring that all technical and financial objectives of the proposed projects are met will be assumed by the Project Manager, *Ms. Peggy Derrick***.** *Ms. Derrick* is an aquatic scientist with experience conducting and managing aquatic investigations and dredged material evaluations. She is skilled in planning, scheduling, costing, and implementing dredged material testing programs. She will be responsible reviewing the Sampling and Analysis Plan, coordinating with USACE-Mobile District and USEPA Region 4, and reviewing the data report. She has extensive experience writing and reviewing Project Sampling and Analysis Plans, Field Sampling Plans (FSP), Quality Assurance Project Plans (QAPP), and Site Safety and Health Plans (SSHP) for dredged material testing programs for federal, industrial, and private sector clients. She is familiar with physical, chemical, and biological testing requirements for dredged material placement in inland and open water, and has coordinated testing programs for the USACE Districts in Mobile, Norfolk, New York, Baltimore, Savannah, and Charleston.

Dr. Christine Papageorgis serves as EA's Chief Scientist and will administer QA/QC and Senior Technical Review for these projects. She has 30 years of experience and management of multidisciplinary projects. She will be responsible for assessing EA's performance of the projects and instituting any necessary program changes to ensure project success and client satisfaction.

Mr. Kris Hoiem will serve as the project Health and Safety Manager. He is a Certified Industrial Hygienist (CIH) with expertise in health and safety audits involving chemical, physical, and biological agents. He will be responsible for review of the Site Safety and Health Plan for the field activities.

Mr. William Goodfellow, EA's National Technical Director for Ecotoxicology and Bioassessment, will provide Senior Technical Review and will serve as the Principal-in-Charge of the projects. He will review work plans and reports submitted to USACE-Mobile. He has over 25 years of experience with assessment projects requiring sampling, analytical, and ecotoxicological characterizations. His technical expertise is in aquatic ecotoxicology, and he has provided mentoring and management for ecotoxicological studies for federal, state, and private sector clients. He has participated in and provided Senior Technical Review for numerous sediment-related projects.

Mr. Ward will be responsible for overseeing the collection of the sediment cores with respect to their sample integrity. He is a geological oceanographer with extensive experience conducting sediment investigations. He has participated in numerous sediment investigations for industrial and private sector clients as well as sediment sampling programs for the USACE Districts in Mobile, Baltimore, Charleston, Savannah, and Norfolk. Mr. Ward has conducted numerous studies involving sediment grab and vibracore sampling to analyze chemical and biological constituents; maintenance and operation of various oceanographic field equipment and instrumentation, differential global positioning systems (DGPS), and boat and marine vessel equipment. Mr. Ward will provide daily field progress updates to Ms. Derrick throughout the sample collection process. Assisting Mr. Ward in the field will be *Construction Solution International.*

Ms. Olsen will serve as the technical lead for the development of the Project Sampling and Analysis Plan, data analysis and report preparation. Her responsibilities for the projects will also include: coordination with laboratory personnel; planning and coordination of field efforts; sample coordination and management; data analysis and integration; and writing technical reports. Ms. Olsen is a marine geochemist with a background that has focused on sediment and water geochemistry, including extensive experience designing and conducting sediment investigations for Federal, state, and private sector clients.

Mr. McCulloch has extensive ecotoxicology experience and manages the ecotoxicological facilities at EA. He will be responsible for tracking the progress of USACE-Mobile District project samples and for scheduling, staffing, and implementing the ecotoxicological tasks of the projects, with daily updates to Ms. Derrick. Mr. McCulloch has more than 32 years of experience in aquatic toxicity testing, and his technical responsibilities include: design, implementation, and interpretation of whole effluent toxicity (WET) testing programs, toxicity reduction evaluations (TREs), dredged material evaluations, sediment toxicity and soil toxicity studies. He also designs and directs bioaccumulation evaluations, water effect ratio (WER) programs, wastewater treatability projects, and spill response studies. He has directed projects involving the chemical, toxicological, biological, and physical assessment of contaminated sediment and soil samples, and has managed fresh water, estuarine, and marine studies evaluating the acute and chronic toxicity of sediments to fish and invertebrates and the bioaccumulative potential of sediment contaminants to aquatic organisms.

EA's Ecotoxicological Laboratory

EA's Ecotoxicology Laboratory will conduct the ecotoxicological testing required for the project sediments and elutriates. EA's Ecotoxicological Laboratory provides testing for effluents, surface and groundwater, sediment, soil, sludge, and products. The laboratory conducts (on average) 2,000 tests each year with sediments and other environmental samples. More than 50,000 tests have been performed since our ecotoxicology laboratory opened in 1981. Of that total, more than 7,000 tests have dealt with solid-phase testing of sediments. Recent USACE clients include Baltimore, Mobile, Savannah, Wilmington, Charleston, and New York Districts.

EA's Ecotoxicology Laboratory provides services for clients who require high-quality toxicity testing, careful interpretation of data, and appropriate application of results to project-specific objectives. Our laboratory is certified by the National Environmental Laboratory Accreditation Program (NELAP), the Nation's only certification program for Ecotoxicological Laboratories. EA's experienced staff of aquatic and environmental toxicologists is thoroughly familiar with applied toxicity testing for dredged material evaluations. The laboratory routinely conducts water column bioassays, whole sediment bioassays, plant survival, and bioaccumulation (for both aquatic invertebrates and terrestrial plants) studies for dredged material evaluations following guidelines in the OTM, the ITM, the *Upland Testing Manual (UTM)* and Regional Implementation Manuals (RIMs). The laboratory uses a variety of freshwater, estuarine, marine, and terrestrial test species.

Additional Team Members

Construction Solutions International (CSI) of Theodore, Alabama will provide the work platform (barge and workboats), crane, and tugboat for the projects. Construction Solutions International specializes in providing a variety of sampling and equipment support services to business and industry in the southern Alabama area. Jerry Bailey, Jr. is a 100-ton licensed captain and is experienced with heavy equipment operations and marine sampling operations. Construction Solutions International's employees are OSHA 40-hour certified.

TestAmerica-Pittsburgh will provide EA with analytical and physical chemistry support for the projects and will assist in the preparation of the project-specific analytical SAP/QAPP in accordance with USEPA Region 4 requirements, the *Inland Testing Manual* (ITM), and *Ocean Testing Manual* (OTM). *Ms. Carrie Gamber* will serve as the Analytical Laboratory Project Manager. She manages analytical laboratory projects for a variety of port, USACE, private sector, and utility clients. She is experienced with sample management, laboratory subcontracting activities, and USEPA specified guidance. She will be responsible for tracking the project samples through the analytical testing process, and she will provide progress reports on bulk sediment, elutriate, and site water analyses to Ms. Olsen.

The majority of analytical testing will be conducted at TestAmerica-Pittsburgh, with support from Burlington, North Canton, and Knoxville laboratories. The TestAmerica-Pittsburgh laboratory provides analytical support for sediment programs nationwide and provided analytical support to EA for previous dredged material projects.

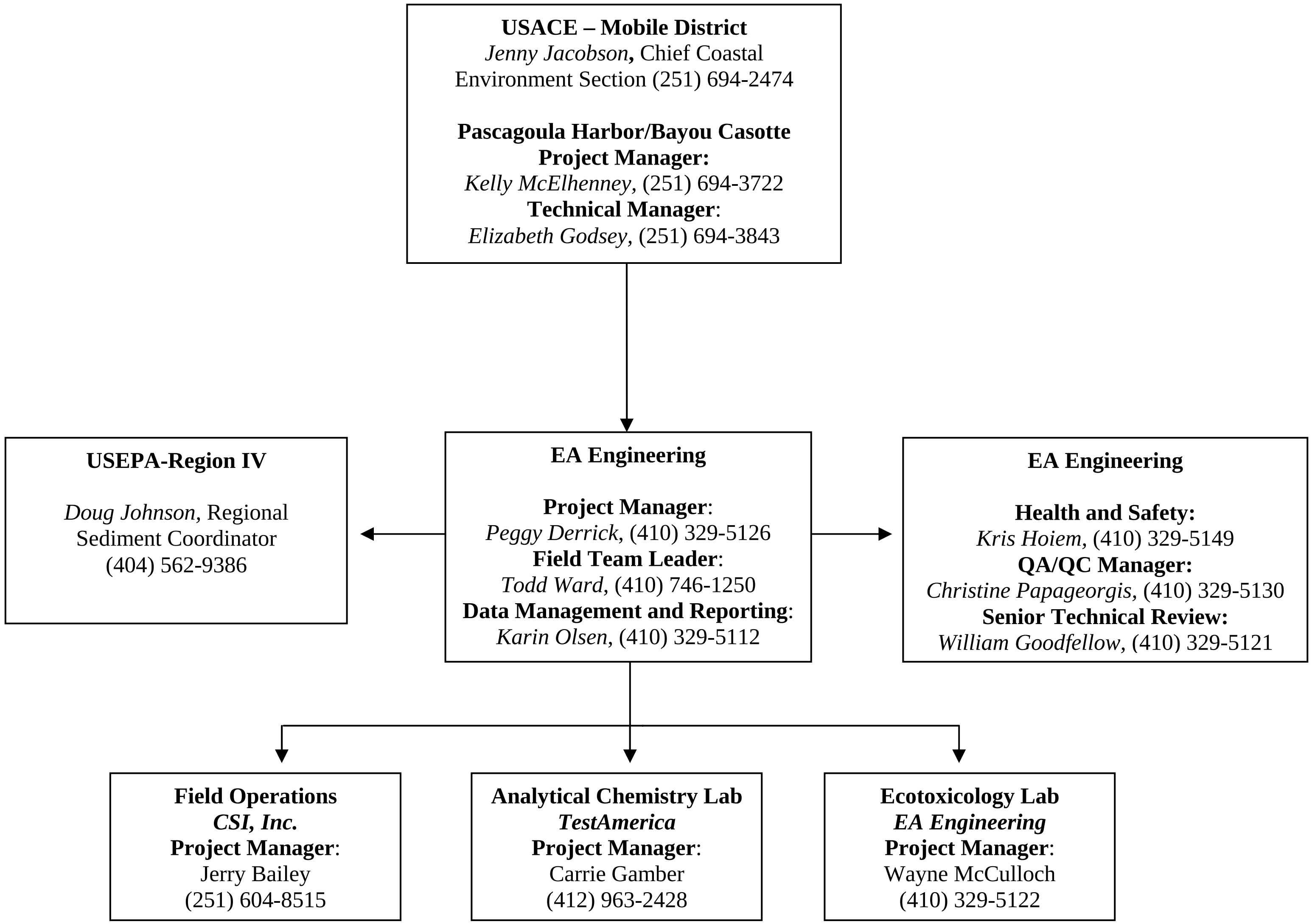
TestAmerica is certified by all 50 states and is also USACE-certified. TestAmerica has provided chemistry as well as physical testing support for sediment projects nationwide including sites in New England, Mid-Atlantic, Southeast, Gulf Coast, the Great Lakes, Puget Sound, Willamette River, and San Francisco Bay. USACE District clients have included: New England, New York, Philadelphia, Baltimore, Norfolk, Savannah, New Orleans, Tulsa, Buffalo, Kansas City, and Detroit.

TestAmerica will provide the full spectrum of analytical chemistry services required for the ITM and OTM including: preparation of standard and modified/effluent elutriates; and analysis of sediment, site water, elutriate, and biological tissue for organic, inorganic, and nutrient compounds. TestAmerica routinely meets the target detection limit requirements and data quality objectives of the SERIM, the ITM, and the OTM.

Table 4.1. Project Team Contacts

Project Role	Technical Expert	Affiliation	Address	Phone	Email	Responsibilities
USACE-Mobile Project Manager Pascagoula Harbor	Elizabeth Godsey	USACE-Mobile	109 St. Joseph Street Mobile, AL 36602	(251) 694-3843	elizabeth.s.godsey @sam.usace.army. mil	Project coordination, report review, sampling design
USEPA Project Manager	Doug Johnson	USEPA-Region IV	61 Forsyth St., SW Atlanta, GA 30303	(404) 562-9386	johnson.doug@epa .gov	Document review, give concurrence/ approval for offshore disposal per Green Book (USEPA 1991), SERIM (USEPA/USACE 1993), and the ITM (USEPA 1998)
Contractor	Peggy Derrick	EA Engineering	15 Loveton Circle, Sparks, MD 21152	(410) 329-5126	pderrick@ eaest.com	Project planning, staffing and budget and project sampling design
Contractor	Todd Ward	EA Engineering	15 Loveton Circle, Sparks, MD 21152	(410) 456-1250	tward@ eaest.com	Field logistics, sample collection and transport, chains-of-custody, sample collection QA/QC
Contractor	Karin Olsen	EA Engineering	15 Loveton Circle, Sparks, MD 21152	(410) 329-5112	kolsen@ eaest.com	Laboratory coordination, data analysis and interpretation, data QA/QC, final data reporting
Subcontractor	Jerry Bailey	Construction Solutions International	1289 Deadlake Road P.O. Box 218 Axis, AL 36505	Office: 251-675-6432 Cell: 251-604-8515	jerry@construction solutions.us	Vessel support and vibracoring during the field sampling
Analytical Lab	Carrie Gamber	TestAmerica - Pittsburgh	301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238	(412) 963-2428	carrie.gamber@ testamericainc.com	Sample holding and archiving laboratory preparation and analysis for sediment, elutriate and tissues.
Ecotoxicology Lab	Wayne McCulloch	EA Engineering	15 Loveton Circle, Sparks, MD 21152	(410) 771-4950	wmcculloch@ eaest.com	Sample holding and archiving, laboratory preparation and analysis for ecotoxicological tests

Figure 4.1. Project Team – Organizational Chart



5.0 ELEMENT A5 – PROBLEM DEFINITION/BACKGROUND

5.1 Purpose and Need for Projects

USACE-Mobile District is tasked with collecting and analyzing proposed dredged material samples from the Pascagoula Harbor Navigation Channel Improvements Project and the Pascagoula Bar Channel. The Pascagoula Harbor Navigation Channel Improvements Project is proposed new work dredging to support a channel-widening project. Specifically, the Bayou Casotte Channel and Pascagoula Lower Sound Channel are proposed for widening up to 150 feet beyond the Federal navigation project's current dimensions. For the Pascagoula Bar Channel, sampling will be conducted to provide information to support maintenance dredging in the channel.

An evaluation of the dredged material is required prior to dredging and placement to ensure that the materials are appropriate for available placement options. The purpose of these projects is to collect the data that are necessary to document the existing physical and chemical attributes of the sediments to facilitate appropriate placement of the dredged material. Sediment and site water from the proposed project areas will be characterized with regard to physical, chemical, and ecotoxicological characteristics. Sampling locations were chosen by USACE-Mobile District to target areas of shoaling or proposed channel widening along each channel reach.

The Pascagoula Harbor Navigation Channel Improvement investigation will consist of vibracoring at specified locations adjacent to the Pascagoula Harbor Federal navigation channels; sediment grab sampling at the reference sites; collecting site water at two locations in Pascagoula Harbor (one in the upper portion of the Bayou Casotte Channel and one in the Lower Pascagoula Channel); conducting analytical testing of sediments, site water, and standard elutriates; conducting ecotoxicological testing (water column, whole sediment, and 28-day bioaccumulation bioassays); and evaluating test results.

The Pascagoula Bar Channel investigation will consist of sampling four locations for grain size analysis. If expedited analysis of grain size in those samples indicate that the categorical exclusion criteria (samples comprised of 88 percent sand or greater) are not met, then one site water sample and two composite sediment samples will be collected and submitted for analysis. The reference site samples collected for the Pascagoula Harbor Navigation Channel Improvement investigation will also be used as reference samples for the Pascagoula Bar Channel investigation.

5.2 Previous Dredging, Sampling, and Testing in Pascagoula Harbor

Recent sampling of the Pascagoula River and Pascagoula Upper Sound included bulk sediment analysis, elutriate testing, water column bioassays, whole sediment bioassays, and bioaccumulation studies of sediment samples proposed for maintenance dredging. The three most recent sampling events were conducted by EA Engineering, Science, and Technology in 2002 (EA 2002), again after Hurricane Katrina in 2006 (EA 2006a) and in 2009 (EA 2010). The results of these reports are briefly summarized below.

In 2002, 2006, and 2009, the bulk sediment testing consisted of analyses for semivolatile organic compounds (SVOCs), chlorinated and organophosphorus pesticides (2002/2006 only), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, dioxin/furan congeners, tributyltin, nutrients, cyanide, acid volatile sulfides and simultaneously extracted metals (AVS and SEM), total organic carbon (TOC), grain size, and total solids. Elutriates were prepared using site water collected from one location within Pascagoula Harbor and using sediments from each channel station. Elutriates were tested for the same suite of chemical analytes as the sediment samples.

Findings from the 2002 and 2006 reports included (data analysis for the 2009 project is in progress):

- Comparisons of the physical characteristics of the sediments indicated that the grain size of the reference sediment was similar to the characteristics of the channel sediments and primarily comprised of silt and clay particles.

- Metals, nutrients, dioxin/furan congeners, PAHs, and PCB congeners were detected at low concentrations in the Upper Pascagoula and Pascagoula River channel sediments that were comparable to the concentrations detected at the Grand Bay Reference Site.

- Butyltins and organophosphorus pesticides were not detected, and SVOCs and chlorinated pesticides were infrequently detected at low concentrations in the Upper Pascagoula and Pascagoula River channel sediments.

- Generally, more chemical constituents and higher concentrations of the organics (PAHs, PCB congeners, and dioxin congeners) were detected in the samples from the upper part of the Upper Pascagoula and Pascagoula River channels.

- Comparison to sediment quality guidelines indicated that several constituents – two metals, two chlorinated pesticides, five PAHS, and total PCBs had concentrations that were between TEL and PEL values in at least one sample.

- Detected constituents in both the site water/elutriate preparation water and the standard elutriates from the Pascagoula River Channel and the Upper Pascagoula Sound Channel sediments were generally detected at low concentrations, below USEPA/State of Mississippi acute and chronic water quality criteria for the protection of aquatic life.

- The concentrations of four metals (nickel, arsenic, copper, and selenium) slightly exceeded USEPA acute and chronic water quality criteria for the protection of aquatic life in full-strength elutriates for the Pascagoula River and Pascagoula Upper Sound Channel. However, arsenic and selenium concentrations in the Pascagoula River and Pascagoula Upper Sound standard elutriates were comparable to concentrations in the elutriate preparation water.

- There was no substantial difference between the standard elutriates from the Pascagoula River Channel and the Pascagoula Upper Sound Channel.

- Ammonia concentrations exceeded both the calculated acute criterion and the chronic criterion at each location during both sampling events.

- In each case, results of STFATE modeling indicated that a sufficient dilution can be achieved to meet both the acute and chronic water quality criterion for ammonia (NH3-N) for the standard elutriates from the Pascagoula River and Upper Sound Channels.

- In water column tests, *A. punctulata* (2002 study) or *M. edulis* (2006 study) was the most sensitive water column species to the project sediments. Some water column toxicity was observed, but STFATE modeling indicated that sufficient dilution required to achieve 0.01 of the EC50 during dredged material placement would be achieved.

- Whole sediment testing indicated that none of the Upper Pascagoula and Pascagoula River channel sediments were acutely toxic to either *N. arenaceodentata* or *L. plumulosus*.

- Survival results from the bioaccumulation tests with *N. virens* (sand worm) and *M. nasuta* (blunt-nose clam) indicated that after 28 days of exposure, none of the test sediments had significantly ($p=0.05$) lower survival than the reference sediment.

- In the *N. virens* tissue, PCB congeners had the greatest number of mean concentrations that statistically exceeded the reference concentration, while PAHs and pesticides had the fewest number of significant exceedances in the *N. virens* tissue. In the *M. nasuta* tissue, PAHs and PCB congeners had the greatest number of mean concentrations that statistically exceeded the reference concentration. Mean concentrations of OCDD and 2,3,7,8-TCDF each statistically exceeded the mean reference concentration for worm and clam tissues exposed to sediment from PH05-02. However, the dioxin TEQ (ND=RL) for worm and clam tissues exposed to sediment from PH05-02 did not statistically exceed the reference site tissue dioxin TEQ (ND=RL). None of the metals statistically exceeded the reference concentration in the *M. nasuta* tissue.

- Results from the tissue contaminant analyses show that tissue-residue concentrations in *N. virens* and *M. nasuta* exposed to Upper Pascagoula and Pascagoula River channel sediments are substantially lower than the USFDA Action Levels and USEPA Guidance Levels.

5.3 Identification of Principle Data Users and Decision Makers

Table 5.1. Principle Data Users and Decision Makers

Agency-Organization	Location	Area(s) of Responsibility
USACE-Mobile	Mobile, Alabama	Design, permit, construct, and maintain the Federal navigation channels in Pascagoula Harbor; manage placement location and frequency in the Pascagoula Ocean Dredged Material Disposal Site (ODMDS)
USEPA-Region 4	Atlanta, Georgia	Review data/documents and provide concurrence for ocean placement of dredged material, in accordance with appropriate guidance

6.0 ELEMENT A6 – DREDGING PROJECT/TASK DESCRIPTION

The U.S. Army Corps of Engineers (USACE)-Mobile District, is tasked with collecting and analyzing proposed dredged material samples from locations adjacent to the Federally authorized navigation channels in Pascagoula Harbor, Mississippi. The Bayou Casotte Channel and Pascagoula Lower Sound Channel are proposed for widening up to 150 feet beyond the Federal navigation project's dimensions. Therefore, sampling and analysis of the proposed dredged material is required to determine suitability for proposed open water placement options. Additionally, surface sampling will be performed in the Pascagoula Bar Channel to determine if the material meets the categorical exclusion. If the material in Pascagoula Bar does not meet the categorical exclusion, additional sediment, elutriate, and ecotoxicological testing will be conducted to determine suitability for proposed open water placement in the Pascagoula ODMDS.

Sediment and site water from the project areas will be characterized with regard to physical, chemical, and ecotoxicological characteristics. Sampling and analysis of the material proposed for dredging is required to determine the potential for release of chemicals during the dredging and placement process and to assess compliance with state water quality standards. Sediment characteristic information will be used to conduct modeling behavior of dredged material at the ocean placement sites for each project area.

EA Engineering, Science, and Technology, Inc. (EA) was contracted to collect and analyze sediment and site water for the project. The primary investigations will consist of vibracoring at specified locations in Bayou Casotte Channel and the Pascagoula Lower Sound Channel (Figure 6.1); sediment grab sampling and water sampling at the reference sites; collecting site water; conducting analytical testing of sediments, site water, elutriates, and ecotoxicological samples; and evaluating test results. The Pascagoula Bar Channel investigation will consist of collecting one site water sample and four individual sediment samples with a grab sampler.

6.1 Project Purpose

The purpose of this project is to collect and analyze proposed dredged material samples from areas adjacent to the Federally authorized navigation project in Pascagoula Harbor, Mississippi and to provide the data necessary to document the existing physical and chemical characteristics of sediments in the project areas.

The objectives of the Pascagoula Harbor Navigation Channel Improvement project and Pascagoula Bar Channel investigations are to:

- Collect the required volume of sediment for physical, chemical, and biological analyses;
- Collect samples from specified locations within positioning accuracy appropriate for the project objectives;
- Collect and transfer water and sediment to appropriate, laboratory-prepared containers and preserve/hold samples for analysis according to protocols that ensure sample integrity;
- Test and characterize sediments with regard to physical characteristics, chemical contamination, the potential for the release of chemicals during the dredging process, and determine compliance with state water quality standards (as necessary for the Pascagoula Bar Channel);
- Use sediments and water samples to perform toxicity and bioaccumulation analysis on designated species (as necessary for the Pascagoula Bar Channel);
- Use the above information to conduct modeling of the behavior of dredged material at the placement sites for Pascagoula Harbor Navigation Channel Improvement project and, if appropriate, for Pascagoula Bar Channel maintenance dredging as well. Modeling will be conducted using the STFATE model for inclusion in the Section 103 reports; and

- Produce a Section 103 evaluation report for the placement of dredged material within the ODMDS for the Pascagoula Harbor Navigation Channel Improvement project as required by the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA).

A summary of the results of the sampling and analysis of dredged material evaluations conducted previously in Pascagoula Harbor is provided in Element A5.

6.2 Project Location

This project includes sampling and testing of maintenance dredged material samples from Pascagoula Harbor, Jackson County, Mississippi (from both the Bayou Casotte Channel and Pascagoula Lower Sound Channel). Both channels are industrialized Federal navigation channels with container facilities that are used primary for commercial and private shipping, although recreational use of both channels is common. Additionally, surface grab samples will be taken from the Pascagoula Bar Channel to support maintenance dredging.

The Pascagoula Harbor Navigation Channel Improvement project will be managed (and sampled and tested) separately from the Pascagoula Bar Channel project; therefore the projects are discussed in individual sections below.

<u>Pascagoula Harbor Navigation Channel Improvement</u>
Approximately 3 million cubic yards of material will be dredged as part of the Pascagoula Harbor Navigation Channel Improvement project (Table 6.1). Dredging and subsequent placement in the Pascagoula ODMDS (Figure 6.1) will be conducted using a hydraulic pipeline dredge.

The Pascagoula Harbor Navigation Channel Improvement project includes sampling in two of the channel reaches that comprise the Pascagoula River Federal navigation project – Pascagoula Lower Sound and Bayou Casotte (Figure 6.1).

The federally authorized Bayou Casotte channel (Figure 6.1) provides for a channel 42 feet deep (mean lower low water [MLLW]) and 350 feet wide from its junction with the Lower Pascagoula channel to the northern limit of the northern turning basin in the Bayou Casotte Inner Harbor, for a total distance of approximately 4.6 miles. One turning basin, located on the west side of the mouth of Bayou Casotte, is 42 feet deep (MLLW), 1,150 feet long, and 350 feet wide. A second turning basin, located at the northern terminus of the Federal project in the Bayou Casotte Inner Harbor, is 42 feet deep (MLLW), 1,750 feet long, and 900 feet wide.

The Pascagoula Lower Sound Channel (Figure 6.1) provides a channel 42 feet deep (MLLW) and 350 feet wide extending from the bend at the northern end of Horn Island Pass approximately 5 miles north to the 'Y' intersection with the Upper Pascagoula and Bayou Casotte Channels. The channel is dredged to the authorized depth plus an additional 2 feet for over depth allowance and an additional 2 feet for advanced maintenance.

Table 6.1. Dredging Volume and Channel Dimensions for Pascagoula/Bayou Casotte Channels

Channel Reach	Type of Dredging	Approximate Volume	Existing Width (ft)*	Proposed Width (ft)*
Bayou Casotte	Widening	2.2 mcy	350	Up to 500
Pascagoula Lower Sound	Widening	1.8 mcy	350	Up to 500

The reference site sediment for the Bayou Casotte sampling will be collected from location RS-PAS-B, and the reference site sediment for the Pascagoula Lower Sound sampling will be collected from location RS-PAS-D. Both reference sites are located in the Gulf of Mexico, south of Horn Island, Mississippi (Figure 6.1).

<u>Pascagoula Bar Channel</u>
Approximately 500,000 cy of material are dredged from the Pascagoula Bar Channel every 3 to 5 years. Dredging and subsequent placement in the Pascagoula ODMDS will be conducted using a hydraulic pipeline dredge.

The reference site sediment for the Pascagoula Bar Channel project will also be collected from locations RS-PAS-B and RS-PAS-D in the Gulf of Mexico (Figure 6.1).

6.3 MPRSA Section 103 Compliance

A Section 103 evaluation for the ocean placement will be required for each project. These evaluations are required under Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA). Section 103 of MPRSA (Public Law 92-532) requires that all proposed operations involving the transportation and discharge of dredged material into ocean waters be evaluated to determine the potential environmental impact of ocean placement. The proposed placement is evaluated using USEPA acute water quality (40 CFR 220-228).

Specific testing methods are described in OTM (or Green Book) (USACE/USEPA 1991), the ITM (USACE/USEPA 1998), and the SERIM (USACE/USEPA 2008). The sampling and physical/chemical, toxicological, and bioaccumulation testing proposed in this SAP/QAPP will be conducted following the guidance to determine the suitability of the sediment for ocean placement.

No permits will be required for this project.

6.4 Technical Approach

The field investigation will consist of obtaining sediment samples using a vibracore from locations within and adjacent to in the Federal navigation channels in Pascagoula Harbor. Surficial sediments will be collected from the reference sites using a Van Veen grab sampler. Sampling locations for the project were provided by USACE-Mobile District. Target coordinates (northings and eastings, Mississippi East State Plane NAD83) are provided in Section 10. Locations will be identified in the field using a Trimble ProXRS Differential Global Positioning System (DGPS). The DGPS uses the United States Coast Guard Differential Beacon System to obtain sub-meter accuracy.

Upon completion of field activities, sediment samples will be transported to EA's facilities in Sparks, Maryland, for processing. Samples will be submitted to analytical laboratories for physical and chemical analysis and to the ecotoxicological laboratory for biological testing.

Details of the sampling program are provided in Section 10, however, the technical approach for each project area is summarized below.

<u>Pascagoula Harbor Navigation Channel Improvements</u>
For Pascagoula Harbor Navigation Channel Improvements project, a total of 12 locations will be sampled (Figure 6.1, Table 6.2):

- For the Bayou Casotte Channel, six individual locations will be sampled. Sediment from each location will be used for physical/chemical analysis, standard elutriate analysis, and ecotoxicological testing.

- For the Pascagoula Lower Sound Channel, six individual locations will be sampled and analyzed for physical constituents. Sediment will be composited together into three samples for physical/chemical analysis, standard elutriate analysis, and ecotoxicological testing.

The reference site sediment for the Bayou Casotte sampling will be collected from location RS-PAS-B, and the reference site sediment for the Pascagoula Lower Sound sampling will be collected from location RS-PAS-D. Both reference sites are located in the Gulf of Mexico, south of Horn Island, Mississippi (Figure 6.1).

In addition to the reference site sampling, three locations will be sampled in the Pascagoula ODMDS to evaluate the spatial variability of substrates within the ODMDS. Each location will be tested for grain size and if the grain size from the three locations is sufficiently similar, then the sediment will be composited together to form one sample, which will be used for chemical analysis. If the grain size from the three locations is not sufficiently similar then sediment from each location will be analyzed for sediment chemistry.

Site water for chemical analysis and elutriate preparation will be collected from two locations - one location in Pascagoula Lower Sound and one in Bayou Casotte Harbor. Additionally, receiving water will also be collected from the Pascagoula ODMDS for chemical analysis.

The physical composition of the sediment will be described by grain size, specific gravity, and total solids determinations. Chemical concentrations of metals, chlorinated pesticides, furans/dioxin congeners, butyltins, semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCB congeners), ammonia, cyanide, total sulfides, total Kjeldahl nitrogen (TKN), total phosphorus, nitrate+nitrite, acid volatile sulfides / simultaneously extracted metals (AVS/SEM) (sediment only), and total organic carbon (TOC) will be identified in sediment, site water and standard elutriate samples.

Table 6.2. Technical Approach for Pascagoula Harbor Navigation Channel Improvements

Location	Northing	Easting	Individual Sample ID	Individual Sample Analysis	Composite Sample ID	Composite Sample Analysis
	Mississippi East State Plane, NAD83					
Bayou Casotte Channel						
BCW-01	300097	1085194	BCW-01	Sediment Chemistry, Standard Elutriate, Ecotoxicological Testing	Not Applicable – No composite samples will be created for Bayou Casotte	
BCW-02	297290	1085616	BCW-02	Sediment Chemistry, Standard Elutriate, Ecotoxicological Testing		
BCW-03	294477	1085177	BCW-03	Sediment Chemistry, Standard Elutriate, Ecotoxicological Testing		
BCW-04	292094	1085600	BCW-04	Sediment Chemistry, Standard Elutriate, Ecotoxicological Testing		
BCW-05	289684	1085194	BCW-05	Sediment Chemistry, Standard Elutriate, Ecotoxicological Testing		
BCW-06	287000	1085613	BCW-06	Sediment Chemistry, Standard Elutriate, Ecotoxicological Testing		
Pascagoula Lower Sound						
PLS-01	282071	1085613	PLS-01	Grain size, Sediment Chemistry (archive)	PLS-01/02-SED	Sediment Chemistry, Standard Elutriate, Ecotoxicological Testing
PLS-02	278129	1086484	PLS-02	Grain size, Sediment Chemistry (archive)		
PLS-03	274132	1086484	PLS-03	Grain size, Sediment Chemistry (archive)	PLS-03/04-SED	Sediment Chemistry, Standard Elutriate, Ecotoxicological Testing
PLS-04	270203	1087381	PLS-04	Grain size, Sediment Chemistry (archive)		
PLS-05	266158	1087206	PLS-05	Grain size, Sediment Chemistry (archive)	PLS-05/06-SED	Sediment Chemistry,

Location	Northing	Easting	Individual Sample ID	Individual Sample Analysis	Composite Sample ID	Composite Sample Analysis
	Mississippi East State Plane, NAD83					
PLS-06	263532	1088129	PLS-06	Grain size, Sediment Chemistry (archive)		Standard Elutriate, Ecotoxicological Testing
Reference Sites						
RS-PAS-B	226424.914	1037588.762	PH-REF-B	Sediment Chemistry, Ecotoxicological Testing	Not Applicable – No composite samples will be created for Reference	
RS-PAS-D	216059.397	1061376.062	PH-REF-D	Sediment Chemistry, Ecotoxicological Testing		
Pascagoula ODMDS						
P-ODMDS-01	Need these	Need these	P-ODMDS-01	Grain size, Sediment Chemistry* (archive)	P-ODMDS-01/02/03	Grain size, Sediment Chemistry
P-ODMDS-02	Need these	Need these	P-ODMDS-02	Grain size, Sediment Chemistry* (archive)		
P-ODMDS-03	Need these	Need these	P-ODMDS-03	Grain size, Sediment Chemistry* (archive)		

**If required based on the results of the grain size testing.*

<u>Pascagoula Bar Channel</u>

In the Pascagoula Bar Channel, a total of four locations will be sampled (Figure 6.1, Table 6.3). Grain size will be analyzed at each of the four locations to determine if all or part of the channel meets the exclusionary criteria (88 percent sand or greater) for ocean placement. Based on the results of the grain size analysis, locations that do not meet the exclusionary criteria will be characterized with regard to chemical and ecotoxicological characteristics for ocean placement.

The reference site sediment for the Bayou Casotte and Pascagoula Lower Sound sampling, collected from locations RS-PAS-B and RS-PAS-D in the Gulf of Mexico, respectively, will also be used as reference site sediment for the Pascagoula Bar Channel project (Figure 6.1).

Site water for chemical analysis and elutriate preparation will be collected from one location in the Pascagoula Bar Channel. The receiving water sample collected from the Pascagoula ODMDS for the Pascagoula Navigation Channel Improvements project will also be used as the receiving water sample for the Pascagoula Bar Channel project.

The physical composition of the sediment will be described by grain size, specific gravity, and total solids determinations. Chemical concentrations of metals, chlorinated pesticides, dioxin/furan congeners, butyltins, SVOCs, PAHs, PCB congeners, ammonia, cyanide, total sulfides, TKN, total phosphorus, nitrate+nitrite, AVS/SEM (sediment only), and TOC will be identified in sediment, site water and standard elutriate samples.

Table 6.3. Technical Approach for Pascagoula Bar Channel

Location	Northing	Easting	Individual Sample ID	Individual Sample Analysis	Composite Sample ID	Composite Sample Analysis
	Mississippi East State Plane, NAD83					
Pascagoula Bar Channel						
PB-01	251900	1080784	PBC-01	Grain Size, Sediment Chemistry*, (archive)	PB-01/02	Sediment Chemistry, Standard Elutriate,* Ecotoxicological Testing*
PB-02	247865	1077781	PBC-02	Grain Size; Sediment Chemistry* (archive)		
PB-03	241448	1072187	PBC-03	Grain Size; Sediment Chemistry* (archive)	PB-03/04	Sediment Chemistry, Standard Elutriate*, Ecotoxicological Testing*
PB-04	236390	1067326	PBC-04	Grain Size; Sediment Chemistry* (archive)		
Reference Site						
See Table 6.2						

**If required based on the results of the grain size testing.*

6.4.1 Analytical Testing Program

The proposed analytical testing program, including the analytical methods for the physical and chemical analyses on sediments, standard elutriates, and site water is presented below in Table 6.4. See Section 13.3 for proposed target detection limits.

Table 6.4. Analytical Methods and Testing Program

PHYSICAL ANALYSIS (Sediments)	**Method**	**Reference**
Grain Size	ASTM D422 (Sieve and Hydrometer)	ASTM 1995
Specific Gravity	ASTM D854	USEPA 1979
Total Solids	SW846	USEPA 1997a
CHEMICAL ANALYSIS (Sediments, Elutriates, and Site Water)		
Metals	SW846 6020 (7471A for mercury)	USEPA 1997a
Chlorinated Pesticides	SW846 8081A	USEPA 1997a
Semivolatile Organic Compounds (SVOC)	SW846 8270C	USEPA 1997a
Polycyclic Aromatic Hydrocarbons (PAHs)	SW846 8270C	USEPA 1997a
Polychlorinated Biphenyls (PCB congeners)	SW846 8082	USEPA 1997a
Ammonia	EPA 350.1	USEPA 1997a
Cyanide	SW846 9012A	USEPA 1997a
Total Sulfides	SW846 9030B/9034	USEPA 1997a
Total Kjeldahl Nitrogen (TKN)	EPA 351.2	USEPA 1997a
Total Phosphorus	EPA 365.2	USEPA 1997a
Nitrate+Nitrite	EPA 353.2	USEPA 1997a
Acid Volatile Sulfides/Simultaneously Extracted Metals (AVS/SEM) (sediment only)	EPA Draft 1991	USEPA 1991
Butyltins	Organotins/GC	TA SOP
Dioxin and Furan Congeners	EPA 1613B	USEPA 1994
Total Organic Carbon (TOC)	Lloyd Kahn	USEPA 1988
Selenium (low resolution on site water and elutriate samples)	EPA 1640	USEPA 1997b

BIOASSAY AND BIOACCUMULATION TESTS

Water Column Bioassay toxicity tests using three species:

- *Americamysis bahia* (opossum shrimp),
- *Menidia menidia* (silverside), and
- *Mytilus edulis* (blue mussel)

Water column bioassays will be conducted for 96-hours using *Americamysis bahia* (opossum shrimp), and *Menidia menidia* (silverside). The water column bioassays conducted with the blue mussel (*Mytilus edulis*) will be 48-hour bioassays.

Whole Sediment Bioassay toxicity tests using two species: the estuarine amphipod, *Leptocheirus plumulosus*, and the polychaete *Neanthes arenaceodentata*.

Whole Sediment Bioaccumulation 28-day exposure bioaccumulation testing using two test organisms: *Nereis virens* (polychaete) and *Macoma nasuta* (blunt-nose clam).

CHEMICAL ANALYSIS OF TISSUES

Analyze bioaccumulation test organism tissues for selected contaminants of potential concern (COPCs). Tissues will be analyzed for percent moisture and percent lipids, and additional constituents based on coordination with USEPA-Region IV.

6.4.2 Data Analysis - Applicable Technical Quality Standards or Criteria

Data analysis will include the following tasks:

- Chemical concentrations in bulk sediment will be compared to concentrations at the reference site and to published Sediment Quality Guidelines (SQGs) (MacDonald et al. 1996, Long et al. 1995, CCME 2001) [**NOTE - Comparisons to SQGs will be used for reference only, not for any regulatory decisions**];

- Chemical concentrations in site water, receiving water, and standard elutriate samples will be compared to USEPA saltwater acute and chronic Water Quality Criteria (WQC) for aquatic life;

- For the water column bioassays, LC50 and EC50 will be calculated for survival and effect data, respectively. Results will be statistically compared to determine if organism survival in the Pascagoula Harbor/Pascagoula Bar Channel samples is significantly lower than organism survival in the laboratory control samples;

- For the whole-sediment bioassays, survival data will be statistically compared to the survival in the reference sediment to determine if survival in the Bayou Casotte/Pascagoula Lower Sound/Pascagoula Bar Channel sediment is significantly lower than survival in the reference sediment;

- In the 28-day bioaccumulation tests, survival in the Bayou Casotte/Pascagoula Lower Sound/Pascagoula Bar Channel samples will be statistically compared to survival in the reference sediment to determine if survival is significantly lower than the reference sediment;

- Chemical concentrations in organisms exposed to Bayou Casotte/Pascagoula Lower Sound/Pascagoula Bar Channel sediments will be statistically compared to chemical concentrations in organisms exposed to the reference sediment to determine if uptake of contaminants was significantly higher in organisms exposed to the Pascagoula Harbor/Pascagoula Bar Channel;

- Chemical concentrations in organisms exposed Bayou Casotte/Pascagoula Lower Sound/Pascagoula Bar Channel sediments will be compared to Region 4 bioaccumulation levels (Ecological Non-Specific Effects Threshold and Background Concentrations) (Appendix H of SERIM);

- Uptake ratios will be calculated to quantify the magnitude of contaminant accumulation in tissue;

- Concentrations of target analytes in the worm and clam tissue will be statistically compared against USFDA Action/Guidance/Tolerance Levels to determine if analyte concentrations in tissue are significantly higher, and

- STFATE Modeling will be conducted for the Bayou Casotte/Pascagoula Lower Sound/Pascagoula Bar Channel sediments to determine if chemical constituents detected in the standard elutriate and the LC50/EC50 data meet ocean placement requirements for the Pascagoula ODMDS.

Sediment Quality Guidelines

SQGs are tools which relate the concentrations of contaminants in sediment to some predicted frequency or intensity of biological effects (Batley et al. 2005), and are intended to either be protective of biological resources, or predictive of adverse effects to those resources, or both (Wenning and Ingersoll 2002). The SQGs were developed as informal (non-regulatory) guidelines for use in interpreting chemical data from analyses of sediments. USACE's guidance on using SQGs in dredged material management acknowledges the limitations of each approach used to derive SQGs to date, but concludes that SQGs are still useful as initial screening values.

Concentrations of detected analytes in sediment samples will be compared to SQGs (MacDonald et al. 1996) for marine sediments to assess the sediment quality of the material proposed for dredging. SQGs, specifically the Threshold Effects Level (TEL) / Probable Effects Level (PEL) (MacDonald et al. 1996) approach will be used to identify potential adverse biological effects associated with contaminated sediments. TEL and PEL values for marine/estuarine sediments are provided in Table 6-5.

The TEL and PEL values were derived using concentrations with both effects and no observed effects (Long and MacDonald 1998). TELs typically represent concentrations below which adverse biological effects were rarely observed, while PELs typically represent concentrations in the middle of the effects range and above which effects were more frequently observed (Long and MacDonald 1998). Concentrations that are between the TEL and PEL represent the concentrations at which adverse biological effects occasionally occur.

The heptachlor epoxide PEL value was developed for the Canadian Council of Ministers of the Environment (CCME) (CCME 2001, CCME 1995). The Canadian heptachlor epoxide PEL value was initially developed for freshwater sediment through a modification of the approach used by the National Status and Trends Program. Because of data gaps in toxicity data for heptachlor epoxide in marine sediments, CCME provisionally adopted the freshwater heptachlor epoxide PEL value for marine sediments (CCME 2001).

Table 6-5. Marine Sediment Quality Guidelines

Chemical Name	Units	Threshold Effects Level (TEL)	Probable Effects Level (PEL)
METALS			
ARSENIC	MG/KG	7.24	41.6
CADMIUM	MG/KG	0.68	4.21
CHROMIUM	MG/KG	52.3	160
COPPER	MG/KG	18.7	108
LEAD	MG/KG	30.24	112
MERCURY	MG/KG	0.13	0.7
NICKEL	MG/KG	15.9	42.8
SILVER	MG/KG	0.73	1.77
ZINC	MG/KG	124	271
CHLORINATED PESTICIDES			
CHLORDANE	UG/KG	2.26	4.79
4,4-DDD	UG/KG	1.22	7.81
4,4-DDE	UG/KG	2.07	374
4,4-DDT	UG/KG	1.19	4.77
DIELDRIN	UG/KG	0.72	4.3
GAMMA-BHC	UG/KG	0.32	0.99
HEPTACHLOR EPOXIDE	UG/KG	--	2.74*
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)			
2-METHYLNAPHTHALENE	UG/KG	20.2	201
ACENAPHTHENE	UG/KG	6.71	88.9
ACENAPHTHYLENE	UG/KG	5.87	128
ANTHRACENE	UG/KG	46.9	245
BENZO(A)PYRENE	UG/KG	88.8	763
BENZO[A]ANTHRACENE	UG/KG	74.8	693
CHRYSENE	UG/KG	108	846
DIBENZ(A,H)ANTHRACENE	UG/KG	6.22	135
FLUORANTHENE	UG/KG	113	1,494
FLUORENE	UG/KG	21.2	144
NAPHTHALENE	UG/KG	34.6	391
PHENANTHRENE	UG/KG	86.7	544
PYRENE	UG/KG	153	1,398
PAHs, TOTAL	UG/KG	1,684	16,770
POLYCHLORINATED BIPHENYL (PCB) CONGENERS			
PCBs, TOTAL	UG/KG	21.6	189

Source: MacDonald et al. 1996. Ecotoxicology 5: 253-278.

**Source*: CCME 2001. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life.

Water Quality Criteria

Section 304(a)(1) of the Clean Water Act requires USEPA to develop, publish, and periodically revise criteria for water quality accurately reflecting the latest scientific knowledge. Water quality criteria developed under Section 304(a)(1) are based solely on data and scientific judgments on the relationship between pollutant concentrations and environmental effects. National recommended water quality criteria include previously published criteria that are unchanged, criteria that have been recalculated from earlier criteria, and newly calculated criteria based on peer-reviewed assessments and data.

Analytes detected in the site water, receiving water, and full-strength elutriates will be compared to USEPA saltwater acute and chronic water quality criteria. Criteria were derived from USEPA's *National Recommended Water Quality Criteria* (2009) (Table 6.6). The USEPA acute criterion is based on 1-hour average exposure concentrations and the chronic criterion is based on 4-hour average exposure concentrations.

Table 6.6 USEPA Water Quality Criteria for Target Analytes

		Saltwater Criteria USEPA	
Analyte	**Units**	**Acute [a]**	**Chronic [b]**
Nutrients			
Ammonia	mg/L	(c)	(c)
Cyanide	ug/L	1 [d]	1 [d]
Metals			
Arsenic	ug/L	69 [ef]	36 [ef]
Cadmium	ug/L	40 [f]	8.8 [f]
Chromium	ug/L	1,100 [fg]	50 [fg]
Copper	ug/L	4.8 [f]	3.1 [f]
Lead	ug/L	210 [e]	8.1 [e]
Mercury	ug/L	1.8 [fh]	0.94 [fh]
Nickel	ug/L	74 [f]	8.2 [f]
Selenium	ug/L	290 [f]	71 [f]
Silver	ug/L	1.9 [f]	--
Zinc	ug/L	90 [f]	81 [f]
PCBs			
Total PCBs	ug/L	--	0.03 [i]
Chlorinated Pesticides			
4,4'-DDT	ug/L	0.13 [j]	0.001 [j]
Aldrin	ug/L	1.3	--
Chlordane	ug/L	0.09	0.004
Dieldrin	ug/L	0.71	0.0019
Endosulfan I	ug/L	0.034 [k]	0.0087 [k]
Endosulfan II	ug/L	0.034 [k]	0.0087 [k]
Endrin	ug/L	0.037	0.0023
Gamma-BHC (Lindane)	ug/L	0.16	--
Heptachlor	ug/L	0.053	0.0036
Heptachlor Epoxide	ug/L	0.053 [l]	0.0036 [l]
Methoxychlor	ug/L	--	0.03
Mirex	ug/L	--	0.001

		Saltwater Criteria USEPA	
Toxaphene	ug/L	0.21	0.0002
SVOCs			
Pentachlorophenol	ug/L	13	7.9
Butyltins			
Tributyltin	ug/L	0.42	0.0074

Sources: USEPA 2009. *National Recommended Water Quality Criteria*

Superscripts:

a = acute aquatic life criteria based on 1-hour average exposure concentrations

b = chronic aquatic life criteria based on 4-day average exposure concentrations

c = total ammonia as nitrogen, calculated for each location based on mean salinity, mean water temperature, and mean pH as measured at mid-depth of the water column

d = free cyanide as mg CN/L

e = derived based on data for arsenic^{+3}, but applied to total arsenic concentrations

f = saltwater criteria expressed in terms of dissolved metal in the water column

g = derived for hexavalent chromium (Cr^{+6}) but applied to total chromium concentrations

h = derived from data for inorganic mercury^{+2}, but applied to total mercury concentrations

i = applies to total PCBs (sum of all congeners or all isomer or homologs or Aroclor analyses)

j = this criterion applies to DDT and its metabolites (the total concentration of DDT and its metabolites should not exceed this value)

k = value was derived for endosulfan and is most appropriately applied to the sum of endosulfan I and endosulfan II

l = This value was derived from data for heptachlor and the criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.

Comparison to USFDA Action/Guidance/Tolerance Levels

The purpose of the bioaccumulation testing is to predict the potential for uptake of chemical contaminants in the dredged material by aquatic organisms. The detected tissue residue concentrations in samples from the Pascagoula Bayou Casotte/Pascagoula Lower Sound/Pascagoula Bar Channel project areas will be compared to the USFDA Action/Guidance/Tolerance Levels values, which are derived from risk assessment evaluations for application as critical limits for determining the acceptability of aquatic organisms as food sources to humans. Food lots that exceed the USFDA Action/Guidance/ Tolerance Levels are removed from the market place, and are not considered safe for human consumption. The USFDA Action/Guidance/Tolerance Levels are generally applicable to shellfish, as well as finfish.

The USFDA levels do not indicate the potential for environmental impact on the contaminated organisms or the potential for biomagnification. Because contamination of food in excess of USFDA levels is considered a threat to human health, USEPA and USACE consider concentrations in excess of such levels in any test species to be predictive of benthic bioaccumulation of contaminants (USEPA/USACE 1998). Based on guidance from the *ITM* and the *OTM*, if tissue-residue concentrations are statistically higher than an USFDA Action/Guidance/Tolerance Level, then the dredged material is not suitable for open-water or ocean placement.

USFDA levels exist for arsenic, cadmium, chromium, lead, mercury, and nickel. For substances with USFDA Action Levels the criteria values will be compared to the one-tailed upper 95 percent confidence level of the mean (UCLM) tissue-residue concentrations for each sample. If the UCLM is found to be below the criterion value (indicating a 95 percent probability that the population mean tissue-residue concentration for the sample is below the criterion value), it will be concluded that the criterion value was not exceeded.

6.4.3 Special Personnel or Equipment Requirements

Not Applicable. The field sampling will be conducted using a vibracore unit to collect cores to the project depth in Pascagoula Harbor and Pascagoula Bar Channel. A Van Veen grab sampler will be used to collect surface sediment at the reference locations. Details of the sampling equipment required for this project are provided in Section 10.

6.4.4 Assessment Techniques Needed for the Dredging Project

This project involves the collection of estuarine and marine sediment samples in the Bayou Casotte/Pascagoula Lower Sound/Pascagoula Bar Channels. This is a one-time sampling event (i.e., no long-term maintenance or measurements). The assessment techniques stated in Section 20 are adequate to provide sufficient assurance that the quality objectives of the project will be met.

6.4.5 Schedule for the Work Performed

It is anticipated that sampling for the Bayou Casotte/Pascagoula Lower Sound/Pascagoula Bar Channels will be performed in April 2010 and will take approximately two weeks. The sampling for the Pascagoula Bar Channel project will coincide with sampling for the Pascagoula Harbor Navigation Channel Improvements project. The project schedule is presented below in Table 6.7.

Dredging in the Lower Pascagoula Sound Channel, Bayou Cassotte, and the Pascagoula Bar Channel is anticipated to begin in mid-2011.

Table 6.7 Estimated Schedule for Sampling/Testing/Reporting

Sampling and Analysis Plan	
Development	April 1-5, 2010
Submittal to EPA	April 12, 2010
EPA Review	April 12-21, 2010
Incorporate Comments	April 21-23, 2010
Final	April 23, 2010
Field Investigation	
Mobilization	April 18-19, 2010
Sediment Vibracoring	April 20-28, 2010
Water Sampling	April 29, 2010
Reference Site Sampling	May 1, 2010
Demobilization	May 2-3, 2010
Sediment Processing	May 4-6, 2010
Submit Samples to Analytical Laboratory	May 7, 2010
Laboratory Analysis	
Sediment and Elutriate Analysis	May 10-June 9, 2010
Data Management	June 12-July 3, 2010
Tissue Analysis – Coordination with EPA	Week of July 5
Tissue Analysis	July 12-August 14, 2010
Ecotoxicological Analysis	
Water Column Bioassays	May 17-18, 2010
Whole Sediment Bioassays	May 21-June 1, 2010
Bioaccumulation Exposure	May 11-June 1, 2010

Report	
Data Management	June 8-August 21, 2010
STFATE Modeling	June 14-17, 2010
Draft Report	September 3, 2010
USEPA and USACE Review	September 6-24, 2010
Response to Comments	September 27-30, 2010
Final Report	October 1, 2010

6.4.6 Dredging Project and Quality Records Required, Including the Types of Reports Needed

The following reports will be submitted:

1. Sampling and Analysis Plan/draft Quality Assurance Project Plan (SAP/QAPP) submitted for review and comment. USACE will submit to USEPA for final approval.

2. Final Quality Assurance Project Plan (SAP/QAPP), following update from comments for final approval prior to sampling. USACE will submit to USEPA for final approval.

3. Site Safety and Health Plan (SSHP)

4. Two comprehensive data reports – one for the Pascagoula Harbor project and one for the Pascagoula Bar Channel project. Each report will include a summary of the sampling and testing methodologies, as well as the following:

    - Overview of sampling activities and copies of the field logbook(s);
    - Physical and chemical results for sediments;
    - Chemical results for site water and elutriate testing;
    - Comparison of data to Sediment Quality Guidelines (SQGs) and applicable Water Quality Criteria (WQC);
    - Statistical analysis of the results from ecotoxicological testing (water column bioassays; whole sediment bioassays, and bioaccumulation testing);
    - STFATE modeling to assess compliance with the Limiting Permissible Concentration (LPC) as per CFR 40 Part 227; and
    - Assessment of bioaccumulation potential as per CFR 40 Part 227.

5. The Marine, Protection, Research and Sanctuaries Act of 1972 (MPRSA) Section 103 Sediment Evaluation Testing Reports, one for the Pascagoula Harbor project and one for the Pascagoula Bar Channel project.

6. Chemical Quality Assurance Report (CQAR). The CQAR will evaluate all of the representative data from the field sampling and laboratory analyses. Daily field quality control (QC) reports and specific QC chemical data quality indicators will be evaluated. The Quality Assurance Report will identify non-conformances, QC deficiencies, or other problems that would impact the data quality objectives as specified in the SAP/QAPP. The Chemical Data Quality Assessment Report will summarize the overall usability of the data for the intended purposes. The CQAR report will be an appendix to the Final Sediment Testing Reports.

7. Daily Quality Control Reports (DQCR). A DQCR will be prepared by the Field Team Leader or Project Manager for each day sampling is conducted. This report will contain a description of the work performed, samples collected, general conditions, corrective actions taken, departures from the sampling plans, and any other notes or comments needed that will document the day's activities. This report will be an appendix to the Final Sediment Testing Report.

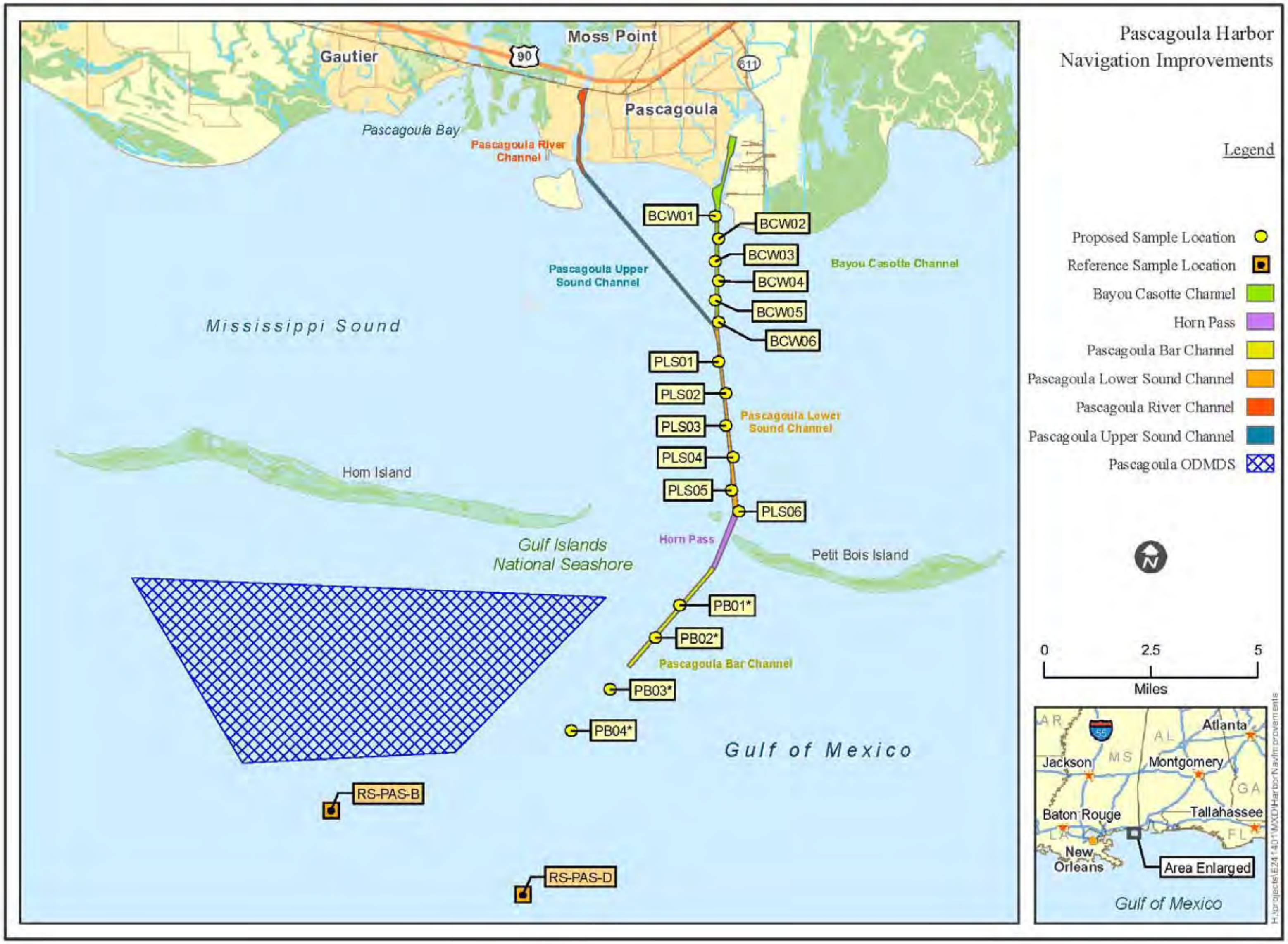


Figure 6.1 Pascagoula Lower Sound, Bayou Casotte, and Pascagoula Bar Channel Sampling Locations

7.0 ELEMENT A7 – QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

Table 7.1 Data Quality Objectives for Sediment, Tissue, and Elutriate Chemical Analyses at TestAmerica

Parameter	QC Measurement	Frequency	Acceptance Criteria	Storage/Holding Times
Semivolatiles, Low Level by GC/MS SW846 8270C	Method Blank (MB)	1 per prep batch	No analytes detected ≥ reporting limit (RL) or ≥ 5% of the measured concentration of that analyte in the associated samples, whichever is higher For common lab contaminants, no analytes > 5x RL If there is not target analyte greater than the RL in the associated samples, the MB may be reported with qualifiers	7 days to extract/40 days to analyze (water) 14 days to extract/40 days to analyze (solid)
	Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	1 set per analytical batch	All target analyte values are within the provided limits for precision and accuracy	
	Duplicate	1 per prep batch or matrix	Relative Percent Difference (RPD) ≤ 30% (between sample and sample duplicate)	
	Standard Reference Material (SRM)	1 per 20 project samples	Within limits specified by provider	
	Initial Calibration	Initial 5-point calibration prior to sample analysis	% RSD ≤ 15%	
	Calibration Verification (CV)	Daily, before sample analysis, and every 12 hours of analysis time	1. Average RL for SPCCs : SVOC - ≥ 0.050 2. %Difference for (Criteria Continuous Concentration) CCCs: SVOCs - ≤ 20% D (Note: D=difference when using RFs or drift when using least squares regression or non-linear calibration) All calibration analytes must be within 20%D, with no individual analytes (except CCC's) > 25%D)	
	Surrogates	All field and QC Samples	All target analyte values are within the provided limits for precision and accuracy	
	Internal Standard	In all field samples and standards	RT ± 30 seconds from RT of the midpoint standard in the ICAL EICP area within -50% to +200% of ICAL midpoint standard	
	Laboratory Control Sediment (LCS)	1 per prep batch	All target analyte values are within the provided limits for precision and accuracy	
	Method Detection Limit (MDL)	Quarterly MDL Checks performed	40 CFR 136B ; MDL verification checks must produce a signal at lease 3x the instrument's noise level.	
	Tuning	Every 12 hours	Within limits of method (including DFTPP criteria, DDT breakdown, and tailing factors)	

Parameter	QC Measurement	Frequency	Acceptance Criteria	Storage/Holding Times
Pesticides by SW846 8081A PCB Congeners by SW846 8082	MB	1 per prep batch	No analytes detected ≥ RL or ≥ 5% of the measured concentration of that analyte in the associated samples, whichever is higher For common lab contaminants, no analytes > 5x RL If there is not target analyte greater than the RL in the associated samples, the MB may be reported with qualifiers	7 days to extract/40 days to analyze (water) 14 days to extract/40 days to analyze (solid)
	MS/MSD	1 set per analytical batch	All target analyte values are within the provided limits for precision and accuracy	
	Duplicate	1 per prep batch or matrix	RPD ≤ 30% (between sample and sample duplicate)	
	SRM	1 per 20 project samples	Within limits specified by provider	
	Initial Calibration	Initial 5-point calibration prior to sample analysis	% RSD ≤ 20% (alternatively, if the correlation coefficient is >0.99, linear regression may be used.	
	Calibration Verification	After initial calibration and every 20 samples	±15% Difference (For non-routine compounds the CCV may be <25% unless otherwise specified by the project.)	
	Surrogates	All field and QC Samples	All target analyte values are within the provided limits for precision and accuracy	
	Internal Standard	In all field samples and standards	RT ± 30 seconds from RT of the midpoint standard in the ICAL EICP area within -50% to +150% of ICAL midpoint standard	
	LCS	1 per prep batch	All target analyte values are within the provided limits for precision and accuracy	
	MDL	Quarterly MDL Checks performed	40 CFR 136B ; MDL verification checks must produce a signal at lease 3x the instrument's noise level.	
Metals by SW846 6020	MB	1 per prep batch	No analytes detected ≥ RL or ≥ 10% of the measured concentration of that analyte in the associated samples, whichever is higher	180 days
	MS/MSD	Once every 20 samples	75-125%, RPD ± 20%	
	Duplicate	Once every 20 samples	± 20% RPD	
	SRM	1 per 20 project samples (sediment and tissue only)	Within limits specified by provider	
	LCS	Once every 20 samples	80-120%	
	ICV	After Initial Calibration	90-110%	
	CCV	After each calibration and every 10 samples	90-110%	
	Serial Dilution	Once every 20 samples	± 10% of the original undiluted result after dilution correction for sample results ≥ 50X MDL or IDL	

Parameter	QC Measurement	Frequency	Acceptance Criteria	Storage/Holding Times
	MDL	Quarterly MDL Checks performed	40 CFR 136B	
	ICB	After Initial Calibration	<CRQL	
Mercury by SW846 7471A (solid) and SW846 7470A (aqueous)	MB	1 per prep batch	No analytes detected ≥ RL Sample results greater than 20x the blank concentration are acceptable Samples for which the contaminant is <RL do not require redigestion	180 days
	MS/MSD	Once every 20 samples	75-125%, RPD ± 20%	
	Duplicate	Once every 20 samples	± 20% RPD	
	SRM	1 per 20 project samples (sediment and tissue only)	Within limits specified by provider	
	LCS	Once every 20 samples	80-120%	
	ICV	After Initial Calibration	90-110%	
	CCV	After each calibration and every 10 samples	80-120%	
	MDL	Quarterly MDL Checks performed	40 CFR 136B	
	ICB	Beginning of every analytical run, immediately following the ICB	The result must be within +/- RL from zero	
Butyltins (TA SOP)	ICAL	Before sample analysis, when CCVs indicate calibration is no longer valid; after major instrument maintenance	CF: RSD ≤ 20% Linear Regression: r ≥ 0.99	7 days to extract/40 days to analyze (water) 14 days to extract/40 days to analyze (solid)
	ICV	After each initial calibration	% Difference ± 25% from expected value	
	CCV	Daily before sample analysis, every 10 samples and at the end of the analytical sequence	% Difference or Drift ± 25%	
	MB	One per extraction batch of 20 or fewer samples	< RL	
	LCS	One per extraction batch of 20 or fewer samples	All target analyte values are within the provided limits for precision and accuracy	
	MS/MSD Duplicate	Per extraction batch Duplicate: per client request	All target analyte values are within the provided limits for precision and accuracy	
	Surrogate Spike	All field and QC samples	All target analyte values are within the provided limits for precision and accuracy	

Parameter	QC Measurement	Frequency	Acceptance Criteria	Storage/Holding Times
AVS/SEM (USEPA Draft 1991)	MB	1 per prep batch	No analytes < 2x RL	14 days
	MS/MSD	Once every 20 samples	75-125%, RPD ± 20%	
	Duplicate	Once every 20 samples	± 20% RPD	
	LCS	Once every 20 samples	80-120%	
	ICV	After Initial Calibration	80-120%	
	CCV	After each calibration and every 10 samples	± 15%	
	MDL	Quarterly MDL Checks performed	40 CFR 136B	
	ICB	After Initial Calibration	<RL	
Selenium Speciation in Water (BR-0061)	Calibration Standards	Analyzed once per analytical day; Minimum of 5 calibration points	Correlation coefficient ≥ 0.995, 1st standard ≤ PQL, low standard recovery = 75-125%, all other standard recoveries = 80-120%	
	ICV	1 following instrument calibration	Recovery = 85-115%	
	CCV	At beginning and end of 1 per 10 sample preparations	Recovery 75-125%; If performing CCV correction, the initial CCV recovery = 80-120% and subsequent CCV must show linearity (r2≥0.90), but never drop < 50% or increase >200% recovery	
	MB	Minimum of 3 per batch	Mean ≤ MRL; SD ≤ MDL or MBs < 1/10th sample result	
	Blank Spikes	1 per every 20 samples	Recovery = 75-125%	
	MS/MSD	Minimum of 1 per 10 client samples	Recovery = 75-125% and RPD ≤ 20% (may be adjusted to accommodate efficiency factors for RP and APDC preps)	
Cyanide (SW846 9012A)	MB	1 per prep batch	No analytes detected ≥ RL	14 days
	MS/MSD	Once every 20 samples	75-125%, RPD ± 20%	
	LCS	1 per prep batch	85-115%, RPD ± 20%	
	ICV	After Initial Calibration	90-110%	
	CCV	After each calibration and every 10 samples	90-110%	
	IC	Analyzed daily	Correlation coefficient must be ≥ 0.995	
	MDL	Quarterly MDL Checks performed	40 CFR 136B	
Total Kjeldahl Nitrogen (SM 4500 NH3 E)	MB	1 per prep batch	No analytes detected ≥ RL	28 days
	MS/MSD	Once every 20 samples	10-200%, RPD ± 20% (aqueous) 50-120%, RPD ± 50% (solid)	
	LCS	1 per prep batch	65-144%, RPD ± 20% (aqueous) 70-133%, RPD ± 50%	
	MDL	Quarterly MDL Checks performed	40 CFR 136B	

Parameter	QC Measurement	Frequency	Acceptance Criteria	Storage/Holding Times
Total Phosphorus (SM 4500 P E)	MB	1 per prep batch	No analytes detected ≥ RL	28 days
	MS/MSD	Once every 20 samples	56-139%, RPD ± 20% (aqueous) 75-125%, RPD ± 20% (solid)	
	LCS	1 per prep batch	89-115%, RPD ± 20% (aqueous) 75-125%, RPD ± 20%	
	MDL	Quarterly MDL Checks performed	40 CFR 136B	
Sulfide (SW846 9030B/9034)	MB	1 per prep batch	No analytes detected ≥ RL	7 days
	MS/MSD	Once every 20 samples	75-125%, RPD ± 20%	
	LCS	1 per prep batch	85-115%, RPD ± 20%	
	ICV	After Initial Calibration	± 15% of true value	
	CCV	After each calibration and every 10 samples	± 15% of true value	
	MDL	Quarterly MDL Checks performed	40 CFR 136B	
Ammonia (EPA 350.1)	MB	1 per prep batch	No analytes detected ≥ RL	28 days
	MS/MSD	Once every 20 samples	90-110%, RPD ± 20%	
	LCS	1 per prep batch	90-110%, RPD ± 10%	
	ICV	After Initial Calibration	± 10% of true value	
	CCV	After each calibration and every 10 samples	± 10% of true value	
	IC	Prior to sample analysis	Correlation coefficient must be ≥ 0.995	
	ICB	After Initial Calibration	<RL	
	MDL	Quarterly MDL Checks performed	40 CFR 136B	
Nitrate (EPA 353.2) and Nitrite (EPA 353.2)	MB	1 per prep batch	No analytes detected ≥ RL	28 days
	MS/MSD	Once every 20 samples	90-110%, RPD ± 20%	
	LCS	1 per prep batch	90-110%, RPD ± 20%	
	ICV	After Initial Calibration	± 10% of true value	
	CCV	After each calibration and every 10 samples	± 10% of true value	
	IC	Prior to sample analysis	Correlation coefficient must be ≥ 0.995	
	ICB	After Initial Calibration	<RL	
	MDL	Quarterly MDL Checks performed	40 CFR 136B	
Total Organic Carbon (Lloyd Kahn) (sediment only)	MB	1 per prep batch	No analytes detected ≥ RL	14 days
	MS	Once every 20 samples	75-125%, RPD ± 20%	
	Duplicate	Once every 20 samples	RPD ≤ 20%	
	LCS	1 per prep batch	75-125%, RPD ± 20%	
	ICV	After Initial Calibration	± 15% of true value	
	CCV	After each calibration and every 10 samples	± 15% of true value	

Parameter	QC Measurement	Frequency	Acceptance Criteria	Storage/Holding Times
	IC	7 point calibration prior to sample analysis	Correlation coefficient must be ≥ 0.995	
	ICB	After Initial Calibration	<RL	
	MDL	Quarterly MDL Checks performed	40 CFR 136B	
Total Organic Carbon (SM 5310B) (water only)	MB	1 per prep batch	No analytes detected ≥ RL	28 days
	MS/MSD	Once every 20 samples	75-115%, RPD ± 20%	
	LCS	1 per prep batch	80-120%, RPD ± 10%	
	ICV	After Initial Calibration	± 10% of true value	
	CCV	After each calibration and every 10 samples	± 10% of true value	
	IC	5 point calibration prior to sample analysis	Correlation coefficient must be ≥ 0.995	
	ICB	After Initial Calibration	<RL	
	MDL	Quarterly MDL Checks performed	40 CFR 136B	

Table 7.2 Quality Control Criteria for Precision & Accuracy for Matrix Spikes, Matrix Spike Duplicates, Surrogates and Laboratory Control Samples

QC Parameter	Spiking Compounds	Accuracy (%R)		Precision (b)	
		Water	Sediment	Water	Sediment (and Tissue, where applicable)
SW6020 Metals by ICP/MS (Sediment, Water, Tissue)					
Matrix Spike	Aluminum	75-125	75-125	≤20	≤20
	Antimony	75-125	75-125	≤20	≤20
	Arsenic	75-125	75-125	≤20	≤20
	Beryllium	75-125	75-125	≤20	≤20
	Cadmium	75-125	75-125	≤20	≤20
	Chromium	75-125	75-125	≤20	≤20
	Cobalt	75-125	75-125	≤20	≤20
	Copper	75-125	75-125	≤20	≤20
	Iron	75-125	75-125	≤20	≤20
	Lead	75-125	75-125	≤20	≤20
	Manganese	75-125	75-125	≤20	≤20
	Nickel	75-125	75-125	≤20	≤20
	Silver	75-125	75-125	≤20	≤20
	Selenium	75-125	75-125	≤20	≤20
	Thallium	75-125	75-125	≤20	≤20
	Tin	75-125	75-125	≤20	≤20
	Zinc	75-125	75-125	≤20	≤20
LCS	Aluminum	80 – 120	80 – 120	≤20	≤20
	Antimony	80 – 120	80 – 120	≤20	≤20
	Arsenic	80 – 120	80 – 120	≤20	≤20
	Beryllium	80 – 120	80 – 120	≤20	≤20
	Cadmium	80 – 120	80 – 120	≤20	≤20
	Chromium	80 – 120	80 – 120	≤20	≤20
	Cobalt	80 – 120	80 – 120	≤20	≤20
	Copper	80 – 120	80 – 120	≤20	≤20
	Iron	80 – 120	80 – 120	≤20	≤20
	Lead	80 – 120	80 – 120	≤20	≤20
	Manganese	80 – 120	80 – 120	≤20	≤20
	Nickel	80 – 120	80 – 120	≤20	≤20

QC Parameter	Spiking Compounds	Accuracy (%R)		Precision (b)	
		Water	Sediment	Water	Sediment (and Tissue, where applicable)
	Silver	80 – 120	80 – 120	≤20	≤20
	Selenium	80 – 120	80 – 120	≤20	≤20
	Thallium	80 – 120	80 – 120	≤20	≤20
	Tin	80 - 120	80 – 120	≤20	≤20
	Zinc	80 - 120	80 – 120	≤20	≤20
SW7470A, SW7471A Mercury by Cold Vapor Atomic Absorption (Water, Sediment, and Tissue)					
Matrix Spike:	Mercury	75-125	75-125	≤20	≤20
LCS	Mercury	80 - 120	80 - 120	≤20	≤20
SW8081A Chlorinated Pesticides by GC/ECD (Water, Sediment, and Tissue)					
Surrogate Spike	Decachlorobiphenyl (DCB)	10-147	18-145	--	--
	Tetrachloro-m-xylene (TCX)	39-130	31-131	--	--
LCS	gamma-BHC (Lindane)	63-123	66-124	≤21	≤10
	Heptachlor	65-127	73-128	≤25	≤7
	Aldrin	69-121	75-123	≤22	≤12
	Dieldrin	76-119	76-123	≤20	≤18
	Endrin	70-125	77-127	≤24	≤20
	4,4’-DDT	62-120	61-126	≤24	≤37
MS/MSD	gamma-BHC (Lindane)	11-142	11-129	≤49	≤75
	Heptachlor	59-118	43-133	≤51	≤36
	Aldrin	59-116	40-135	≤50	≤37
	Dieldrin	58-126	34-138	≤36	≤39
	Endrin	58-131	37-141	≤36	≤43
	4,4’-DDT	10-156	10-155	≤53	≤71
SW8082 PCB Congeners by GC/ECD (Water, Sediment)					
Surrogate	Tetrachloro-m-xylene (TCX)	30-150	35-150	--	--
	BZ#205	30-130	30-130	--	--
LCS	All 26 Target Congeners	40-140	50-140	≤50	≤50
MS/MSD	All 26 Target Congeners	30-140	45-150	≤50	≤50
SW8270C Semivolatile Organics, Low Level by GC/MS (Sediment, Water, and Tissue-PAH only)					
Surrogate Spike	Nitrobenzene d5	23-112	27-110	--	--

QC Parameter	Spiking Compounds	Accuracy (%R)		Precision (b)	
		Water	Sediment	Water	Sediment (and Tissue, where applicable)
	2-Fluorobiphenyl	19-107	28-108	--	--
	Terphenyl-d14	10-132	21-130	--	--
	2-Fluorophenol	10-111	28-107	--	--
	Phenol-d5	15-112	30-112	--	--
	2,4,6-Tribromophenol	16-122	21-116	--	--
LCS	Phenol	38-95	44-100	≤39	≤40
	2-Chlorophenol	39-93	45-99	≤39	≤40
	1,4-Dichlorobenzene	36-91	39-103	≤41	≤39
	N-Nitroso-di-n-propylamine	41-96	39-111	≤43	≤32
	1,2,4-Trichlorobenzene	35-95	38-103	≤45	≤40
	4-Chloro-3-methylphenol	41-99	37-114	≤42	≤31
	4-Nitrophenol	39-110	24-132	≤42	≤37
	2,4-Dinitrotoluene	37-120	42-118	≤39	≤33
	Pentachlorophenol	23-108	18-117	≤42	≤37
	Acenaphthene	35-96	34-107	≤41	≤36
	4-Bromophenyl phenyl ether	39-94	37-105	≤40	≤20
	Butyl benzyl phthalate	33-106	35-110	≤40	≤34
	Hexachloroethane	38-91	40-102	≤39	≤37
	4-Methylphenol	41-92	40-113	≤41	≤42
	Naphthalene	40-89	38-103	≤43	≤25
	Pyrene	30-106	28-116	≤42	≤28
MS/MSD	Phenol	38-95	44-100	≤39	≤40
	2-Chlorophenol	39-93	45-99	≤39	≤40
	1,4-Dichlorobenzene	36-91	39-103	≤41	≤39
	N-Nitroso-di-n-propylamine	41-96	39-111	≤43	≤32
	1,2,4-Trichlorobenzene	35-95	38-103	≤45	≤40
	4-Chloro-3-methylphenol	41-99	37-114	≤42	≤31

QC Parameter	Spiking Compounds	Accuracy (%R)		Precision (b)	
		Water	Sediment	Water	Sediment (and Tissue, where applicable)
	4-Nitrophenol	39-110	24-132	≤42	≤37
	2,4-Dinitrotoluene	37-120	42-118	≤39	≤33
	Pentachlorophenol	23-108	18-117	≤42	≤37
	Acenaphthene	35-96	34-107	≤41	≤36
	4-Bromophenyl phenyl ether	39-94	37-105	≤40	≤20
	Butyl benzyl phthalate	33-106	35-110	≤40	≤34
	Hexachloroethane	38-91	40-102	≤39	≤37
	4-Methylphenol	41-92	40-113	≤41	≤42
	Naphthalene	40-89	38-103	≤43	≤25
	Pyrene	30-106	28-116	≤42	≤28
TestAmerica-Burlington SOP Organotins by GC/FPD (Water, Sediment)					
Surrogate	Tripentyltin	15-150	30-120	--	--
LCS/MS/MSD	Monobutyltin (The accuracy limits are advisory)	10-48	10-48	≤30	≤30
	Dibutyltin	30-150	30-160	≤30	≤30
	Tributyltin	30-150	30-160	≤30	≤30
E350.1 Ammonia (Water and Sediment)					
LCS	---	90-110	90-110	≤20	≤20
MS/MSD	---	90-110	90-110	≤20	≤20
SW9012A Total Cyanide (Water and Sediment)					
LCS	---	85-115	38-162	≤20	≤50
MS/MSD	---	75-125	75-125	≤20	≤20
SW9034 Sulfide (Water); SW9030B/9034 Sulfide (Sediment)					
LCS	---	85-115	85-115	≤20	≤20
MS/MSD	---	75-125	75-125	≤20	≤20
SM5310B Total Organic Carbon (Water); Lloyd Kahn Total Organic Carbon (Sediment)					
LCS	---	80-120	75-125	≤10	≤20
MS/MSD/DUP	---	75-125	75-125	≤20	≤20

QC Parameter	**Spiking Compounds**	**Accuracy (%R)**		**Precision (b)**	
		Water	**Sediment**	**Water**	**Sediment (and Tissue, where applicable)**
E353.2 Nitrate , Nitrite (Water and Sediment)					
LCS	---	90-110	90-110	≤20	≤20
MS/MSD	---	90-110	90-110	≤20	≤20
SM4500 Total Kjeldahl Nitrogen (Water and Sediment)					
LCS	---	65-144	70-133	≤20	≤50
MS/MSD	---	10-200	50-120	≤20	≤50
SM4500 Total Phosphorus (Water and Sediment)					
LCS	---	89-115	75-125	≤20	≤20
MS/MSD	---	56-139	75-125	≤20	≤20

8.0 ELEMENT A8 – SPECIAL TRAINING REQUIREMENTS/CERTIFICATION

All sampling and field work must conform to the USACE Safety Manual EM 385-1-1 (USACE 2008). In addition, all EA Engineering, Science, and Technology (EA) and Construction Solution International (CSI), employees will be trained to meet 29 CFR 1926.59/1926.65. Personnel who do not meet the following training requirements are prohibited from engaging in sample collection or processing operations. Personnel certifications are provided in the Site Safety and Health Plan (SSHP) (Attachment II).

Site workers are required to have 40 hours of Initial Offsite Hazardous Waste Operations Training and three days of onsite training under the direct supervision of a more experienced site worker. If more than 12 months have passed since initial training, an 8 hour Annual Refresher Training must be completed, or scheduled to be completed by the initiation of sampling or processing.

At least two onsite workers will be currently certified in both first aid and CPR by the American Red Cross or equivalent organization. First aid training and CPR training will be current.

EA and CSI employees will read and sign the Site Safety and Health Plan Review Record (Attachment A in Attachment II) prior to initiation of the field effort. Site workers will have previous field experience prior to conducting this work. Because of the nature of the work, onsite employees will be required to have proficient swimming ability. Employees, subcontractors, and visitors will be required to wear a U.S. Coast Approved Personal Floatation Device.

9.0 ELEMENT A9 – DOCUMENTATION AND RECORDS

9.1 Reporting of Results

The data obtained will be presented in graphical, tabular, and written text as appropriate. The draft and final testing reports will undergo internal technical review and quality assurance review by persons with appropriate technical qualifications to ensure that the report meets the project requirements specified in the technical work plan and the quality assurance (QA) goals. The draft and final reports shall present all aspects of evaluations of the dredged material required under Section 103 of the Marine, Protection, Research and Sanctuaries Act of 1972 (MPRSA) as described in OTM (USACE/USEPA 1991) and shall present the results of field sampling, physical/chemical analyses of sediment, toxicological testing, and bioaccumulation exposures as outlined in Appendix D of the SERIM.

The reports will consist of 8½" by 11" pages with drawings or oversized tables folded, if necessary, to this size. The report margins shall be suitable for use in a durable 3-ring binder. A decimal numbering system will be used, with each section having a unique decimal designation. Reports that require extensive editing, have extensive errors, or are not in the required formats will be rejected and re-submittal will be required. All submittals shall be sent to USACE-Mobile District. Any maps, drawings, figures, sketches, databases, spreadsheets, or text files prepared for this report shall be provided in both hard copy and digital form.

The digital copies of reports and other text documents shall be provided in Microsoft Word 2000 (or higher version) and Adobe Acrobat PDF. Spreadsheet files and data files shall be provided in Microsoft Excel 2000 (or higher version) format and Adobe Acrobat PDF. All text, spreadsheet, and database files shall be delivered compact disk read-only memory (CD-ROM) with ISO-9660 format. Level IV laboratory data should be provided as Adobe Acrobat Portable Document Format (PDF) files.

Geographic data shall be provided in feet and projected into the Mississippi East State Plane coordinate system.

Two draft copies and five final copies of the work plan shall be submitted to the USACE-Mobile District. Five copies of the draft report and five copies of the final report (hard copies and CD) shall be submitted to USACE-Mobile District. Level IV laboratory reporting data will be provided in electronic format only (PDF), on CD-ROM.

9.2 Report Format

The following paragraphs represent the format for electronic files being delivered as part of any contract. These paragraphs do not specify content or what the electronic files should contain. The content or data represented should be specified in the basic Scope of Work.

1. <u>Specifications for Digital Data</u>. Any maps, drawings, figures, sketches, databases, spreadsheets, or text files prepared under the terms of this contract shall be provided in both hard copy and digital form.

2. <u>Digital Mapping and Data Standards</u>: The U.S. Army Corps of Engineers, Mobile District utilizes Computer Assisted Drafting and Design (CADD). Data provided must be readable by Microstation SE or higher to provide design drawings, sketches, or figures. All digital files shall be provided in feet and projected into the Mississippi East State Plane coordinate system. The maps shall use the GRS 1980 spheroid and the North American Datum 1983 (WGS-84) and shall be provided on CD-ROMs.

3. <u>Geographic Information System (GIS) Data Delivery Format</u>

    a. Digital geographic maps and the related digital information shall be developed using double precision and delivered in uncompressed ARC/INFO export file format (.e00) using ARC/INFO Release 8.0 or higher. The Mobile District will also accept ARC/View Shapefiles. These file formats are geographic information system software applications produced by the Environmental Systems Research Institute of Redlands, California, and are in the GIS software suite used by U.S. Army Corps of Engineers, Mobile District.

b. Digital geographic maps and the related digital information shall be usable on an IBM-compatible personal computer system using the Windows NT 4.0 or Windows 2000 operating systems. This data shall be provided on compact disk read-only memory (CD-ROM) with ISO-9660 format.

5. General Digital Standard for CADD and GIS Files

a. Geographic data shall be provided in feet and projected into the Mississippi East State Plane coordinate system. The maps shall use the GRS 1980 spheroid and the North American Datum 1983 (WGS-84). Vertical upland topographic surveys shall use NGVD 1929. Hydrographic survey will reference the local dredging datum which will be provided in the project scope of services. No offsets will be used. Each map layer or coverage shall have a projection file. Map or drawing scales will be determined by the Contracting Officer's Representative for the contract. Mapping accuracy for the agreed scales will conform to the American Society for Photogrammetry and Remote Sensing (ASPRS), "Accuracy Standards for Large-Scale Maps" and "Interim Accuracy Standards for Large-Scale Maps" (ASPRS, 1991).

b. Geographic data must be provided in a form that does not require translation, preprocessing, or post processing before being used in the USACE's System. However, EA will consult with the Government (specifically the Geographic Information Systems Coordinator) concerning the use of alternative delivery formats to provide design drawings, sketches, or figures. All digital files provided will be in the same projection and use the same coordinate system, datum, and units as stated above, and shall be provided on CD-ROMs.

c. Geographic Data Structure: All geographic information shall be developed in a structure consistent with the Spatial Data Standards (SDS), Version 1.9, released in December 1999, or a higher version if available at the time of this project. The Contractor shall consult with the Government concerning modifications or additions to the SDS. The Government may approve modifications to the Standard if it is determined that SDS does not adequately address subject data sets.

d. Geographic Data Documentation: For each digital file delivered containing geographic information (regardless of format), the Contractor shall provide documentation consistent with the "Content Standards for Digital Geospatial Metadata, June 1998" published by the Federal Geographic Data Committee (FGDC). The documentation shall include, but is not limited to, the following: the name and description of the map layer or coverage, the source of the data and any related data quality information such as accuracy and time period of content, the type of data coverage (point, line, polygon, etc.), the field names of all attribute data and a description of each field name, the definition of all codes used in the data fields, the ranges of numeric fields and the meaning of these numeric ranges, the creation date of the map layer and the name of the person who created it. A point of contact shall be provided to answer technical questions.

e. Geographic Data Review: The digital geographic maps, related data, and text documents shall be included for review in the draft and final contract submittals. The reviews may include a visual demonstration of the geographic data on the Windows NT computer system. However, the Contractor shall have a technical consultant available to assist with any digital data discrepancies. The data will be analyzed for subject content and system compatibility. Review comments to data and text shall be incorporated by the Contractor prior to approval of the final submittal.

f. Ownership: All digital files, final hard-copy products, source data acquired for this project, and related materials, including that furnished by the Government, shall become the property of USACE-Mobile District and will not be issued, distributed, or published by the Contractor.

9.3 Data Reporting Package Archiving and Retrieval

All reports, data, field sheets, correspondence, notes, field books, and any other documents associated with this project will be archived by the contractor for a minimum of 5 years from the date of the final report. Prior to disposal of any records, the contractor must contact the client (USACE-Mobile) for authorization and direction in the disposal of said documents.

GROUP B. PROJECT MANAGEMENT

10.0 ELEMENT B1 – SAMPLING PROCESS DESIGN

The field investigation for the Pascagoula Harbor Navigation Channel Improvement project will consist of obtaining sediment cores from six sampling locations in the Bayou Casotte Channel and six locations in the Pascagoula Lower Sound Channel. Reference sediments will be collected from the two Pascagoula reference sites RS-PAS-B (silt) and RS-PAS-D (silty sand). Approximately equal volumes of sediment from each location in Pascagoula Lower Sound Channel will be used to create composite samples for analytical and ecotoxicological testing.

The field investigation for the Pascagoula Bar Channel project will consist of obtaining surficial sediment from a total of four sampling locations. The reference site samples for the Pascagoula Harbor Navigation Channel Improvement project will also be used as reference site samples for the Pascagoula Bar Channel project.

Workdays will be approximately 12 hours in duration (dock to dock), with approximately 8 hours of vibracoring each day. The sequence of core collection in any given area will be dependent upon local site and weather conditions. The day-to-day sequence of sampling will be determined at the discretion of the Field Operations Manager. Upon completion of field activities, sediment cores will be composited to create samples and the samples will be submitted to TestAmerica–Pittsburgh for bulk sediment and elutriate testing and to EA's Ecotoxicology Laboratory for ecotoxicological testing.

10.1 Project Schedule

Sampling in the Bayou Casotte, Lower Pascagoula Sound, and the Pascagoula Bar Channels will take place in April 2010. A detailed project schedule is provided in Section 6.0.

10.2 Rationale for Sampling Design

USACE-Mobile District is tasked with collecting and analyzing proposed dredged material samples from Pascagoula Harbor Navigation Channel Improvement project, specifically from the Bayou Casotte and Pascagoula Lower Sound Channels. The proposed Pascagoula Harbor Navigation Channel Improvement project is a new work dredging project that would include the widening of the Bayou Casotte and Pascagoula Lower Sound Channels and placement of the material in the Pascagoula ODMDS. An evaluation of the dredged material is required prior to dredging and placement to ensure that the materials are appropriate for available placement options. The purpose of this effort is to collect the data that are necessary to document the existing physical and chemical attributes of the sediments to facilitate appropriate placement of the dredged material. Sediment and site water from the proposed project area will be characterized with regard to physical, chemical, and ecotoxicological characteristics.

The Pascagoula Bar Channel portion of the project will be conducted to support continued maintenance dredging in the channel. Grain size samples will be analyzed first to determine if all or part of the channel meets the exclusionary criteria (88 percent sand or greater) for ocean placement. Based on the results of the grain size analysis, locations that do not meet the exclusionary criteria will be characterized with regard to physical, chemical, and ecotoxicological characteristics for ocean placement.

This investigation will consist of vibracoring at specified locations in the Bayou Casotte and Pascagoula Lower Sound Federal navigation channels; sediment grab sampling at the reference sites; collecting site water at two locations in Pascagoula Harbor (one in Pascagoula Lower Sound and one in Bayou Casotte Harbor) and one location in the Pascagoula Bar Channel; collecting sediment and site water from the Pascagoula ODMDS; conducting analytical testing of sediments, site water, and standard elutriates; conducting ecotoxicological testing (water column, whole sediment, and 28-day bioaccumulation bioassays); and evaluating test results.

10.2.1 Dredging Units

Sediment characteristics can vary substantially within the proposed dredging limits because of the spatial variability of geographic and hydrographic conditions, as well as the proximity of the dredging area to anthropogenic source areas of chemical contaminants. The OTM (USEPA/USACE 1991) recommends the proposed dredging projects be divided into dredging units (DUs), which have relatively consistent characteristics and could potentially be managed as separate units, if necessary. DUs can be selected based on historical data, sediment characteristics, geographic configuration, depth of proposed dredging, and/or known or suspected contaminants (SERIM 2008). In addition, DUs can be defined laterally or vertically such that surface sediments can be managed separately from subsurface sediments, if warranted. Spatially, DUs should be selected so that a single sediment analysis can sufficiently characterize the entire DU; therefore, the selection of DUs will determine the number of analytical samples recommended for the project. Typically, the 'single sediment analysis' used to characterize a DU will consist of a sediment from multiple locations that are composited together. Four categories are used to rank DUs – exclusionary, low, moderate, or high – which describe the potential for substantial concentrations of contaminants of concern and/or adverse biological effects to result from dredging these sediments. Guidance for ranking DUs into each of the categories is described in the SERIM.

Previous testing discussed in Section 5.0 indicated that there are low concentrations of contaminants of potential concern (COPCs) and no significant adverse response in biological tests conducted on previously sampled sediments for the Bayou Casotte and Pascagoula Lower Sound channels. The proposed project is not located adjacent to berthing or industrial facilities and is therefore not likely subject to contamination. Also, there are no permitted discharges in the immediate vicinity of the proposed project area.

Previous testing data is not available for the Pascagoula Bar Channel project. The Pascagoula Bar channel is located offshore, south of Horn Pass and Petit Bois Island, and there are no point sources of discharge in this area. Additionally, there are few, if any, anthropogenic influences in this region.

Based on this analysis and data from previous testing, the proposed project sediments for the Bayou Casotte, Pascagoula Lower Sound, and Pascagoula Bar Channels have been given a ranking of 'low' (refer to Table 4-2, SERIM) relative to the potential for significant concentrations of COPCs and adverse biological effects.

<u>Pascagoula Harbor Navigation Channel Improvements</u>

Approximately 3 mcy of material are expected to be dredged as part of the Pascagoula Harbor Navigation Channel Improvements project. Because this is a new work dredging project, USACE-Mobile District has proposed to the following sampling scheme to appropriately characterize the material proposed for dredging:

Channel Reach	Approximate Volume	Dredging Units (DUs)	Number of Locations
Bayou Casotte	2.2 mcy	6	6
Pascagoula Lower Sound	1.8 mcy	3 (each DU will be characterized by material from 2 locations composited together)	6

The general objectives of the field sampling and sample processing for the Pascagoula Harbor Navigation Channel Improvements project include:

- Collecting sediment cores (ranging from approximately 6 to 20 ft below the sediment surface) from each proposed location to a project depth of -46 ft MLLW;
- Collecting surficial sediment from both of the specified Pascagoula reference sites;
- Collecting surficial sediment from three locations in the Pascagoula ODMDS and homogenizing the sediment to create one composite sample for chemical analysis (based on results from the grain size analysis);

- Collecting the required volume of site water from one location in the Pascagoula Lower Sound and one location in the Bayou Casotte Channel for chemical analysis, standard elutriate preparation, and ecotoxicological testing;

- Collecting dredging site water (receiving water) from the Pascagoula ODMDS for chemical analysis;

- Measuring and recording water quality information (temperature, salinity, pH, dissolved oxygen, and turbidity);

- Homogenizing sediment from each location to be submitted for bulk sediment testing and creating composite samples using sediment from multiple locations that will be submitted for bulk sediment, standard elutriate preparation, and ecotoxicological testing:

  - *Pascagoula Lower Sound Channel* – three composite sediment samples, each consisting of sediment from two locations
  - *Bayou Casotte Channel* – six individual sediment samples

- Collecting and transferring water and sediment to appropriate laboratory-prepared containers and preserving/holding samples for analysis according to protocols that ensure sample integrity;

- Completing appropriate chain-of-custody documentation; and

- Providing chemical and biological data to assess potential impacts related to ocean placement, and to document compliance with Section 103 of the Marine Protection, Research, and Sanctuaries Act.

Samples will be collected from specified locations within the Federal navigation channel. Target coordinates (Mississippi East NAD83, U.S. Survey Feet) and coring depths at each location are provided in Table 10.1. Sampling locations will be located in the field using a Differential Global Positioning System (DGPS).

Table 10.1 Pascagoula Harbor – Target Locations and Core Depths

Location	Northing*	Easting*	Depth (ft MLLW)	Target Depth (ft MLLW)	Core Length (ft)	Sample ID	No. Cores
BAYOU CASOTTE CHANNEL							
BCW-01	300097	1085194	35.2	46	11	BCW-01	10
BCW-02	297290	1085616	39.9	46	7	BCW-02	17
BCW-03	294477	1085177	25.9	46	21	BCW-03	5
BCW-04	292094	1085600	37.5	46	9	BCW-04	12
BCW-05	289684	1085194	33.6	46	13	BCW-05	9
BCW-06	287000	1085613	32.7	46	14	BCW-06	8
PASCAGOULA LOWER SOUND CHANNEL							
PLS-01	282071	1085613	32.7	46	14	PLS-01/02	4
PLS-02	278129	1086484	35.4	46	11		5
PLS-03	274132	1086484	33.7	46	13	PLS-03/04	4
PLS-04	270203	1087381	33.2	46	13		4
PLS-05	266158	1087206	31.9	46	15	PLS-05/06	4
PLS-06	263532	1088129	35.8	46	11		5
PASCAGOULA REFERENCE SITES							
RS-PAS-B	226424.914	1037588.762	-	-	-	PH-REF-B	-
RS-PAS-D	216059.397	1061376.062	-	-	-	PH-REF-D	-

**Easting and Northing coordinates in Mississippi East NAD83, U.S. Survey Feet*

Pascagoula Bar Channel

The DUs for the Pascagoula Bar were determined based on the proposed quality of dredged material that is removed during each dredging cycle. A total of 4 locations will be sampled in the Pascagoula Bar Channel, and grain size samples from each location will be analyzed to determine if all or part of the channel meets the exclusionary criteria (88 percent sand or greater) for ocean placement. Based on the results of the grain size analysis, locations that do not meet the exclusionary criteria will be characterized with regard to physical, chemical, and ecotoxicological characteristics for ocean placement.

The general objectives of the field sampling and sample processing for the Pascagoula Bar Channel project include:

- Collect sediment using a Van Veen sampler from each proposed location;
- Collect the required volume of site water from one location in the Pascagoula Bar Channel for chemical analysis and, if needed, for standard elutriate preparation and ecotoxicological testing;
- Measure and record water quality information (temperature, salinity, pH, dissolved oxygen, and turbidity);
- Based on the grain size analysis, homogenize sediment from each location or create two composite samples, each consisting of sediment from two locations, that will be submitted for bulk sediment, elutriate preparation, and ecotoxicological testing:
- Collect and transfer water and sediment to appropriate laboratory-prepared containers and preserve/hold samples for analysis according to protocols that ensure sample integrity;
- Complete appropriate chain-of-custody documentation; and
- Provide chemical and biological data to assess potential impacts related to ocean placement, and to document compliance with Section 103 of the Marine Protection, Research, and Sanctuaries Act.

The analyses of reference site sediment and sediment and dredging site water (receiving water) from the Pascagoula ODMDS collected for the Pascagoula Harbor Navigation Channel Improvement project will also be used for comparison to the results from the Pascagoula Bar Channel project.

Samples will be collected from specified locations within the Federal navigation channel. Target coordinates (Mississippi East State Plane NAD83, U.S. Survey Feet) and coring depths at each location are provided in Table 10.2. Sampling locations will be located in the field using a Differential Global Positioning System (DGPS).

Table 10.2 Pascagoula Bar Channel – Target Locations and Sample Depths

Location	Northing*	Easting*	Depth (ft MLLW)	Target Depth (ft MLLW)	Sample ID
PB-01	251900	1080784	43.8	1	PB-01/02-SED
PB-02	247865	1077781	43.2	1	
PB-03	241448	1072180	45.7	1	PB-03/04-SED
PB-04	236390	1067326	45.9	1	
REFERENCE SITE					
See Table 10.1					

* *Mississippi East State Plane NAD83, U.S. Survey Feet*

10.3 Sampling Design Assumptions

Assumptions used for the creation of this SAP/QAPP include the following:

1. The contractor will have access to each sampling site.

2. If a sampling point needs to be relocated based on logistical concerns, including but not limited to the below-mentioned scenarios, the relocated sampling point will be recorded with a GPS unit. The relocated point will coincide with depths and locations of the dredging prism. Every effort will be taken to inform the USACE Technical Manager, the QA Manager, or the USEPA Project Manager prior to any deviations from this sampling plan. Any deviation will be explained in the DQCR, the field sheet(s), and the testing report.

3. The surveys (bathymetry data) are current, accurate, and the most recently available.

Sampling problems could include submerged utility cables, vessel traffic, and access difficulties. Potential site-specific problems include the following:

- Vessel traffic (ships, tugs/barges, pleasure craft)
- Weather (high winds, lightning, fog) related delays
- Core Refusal

If vessel traffic is heavy in the sampling area, the sampling locations could be relocated, the sampling postponed, or the samples could be taken around the traffic (safety dependent). If weather situations, such as a hurricane or lightning arises sampling will be postponed until the situation clears. If core refusal or limited recovery is encountered during coring operations, a limited number of additional attempts will be made to obtain sufficient sample volume. Three additional attempts will be conducted at a single location if refusal or limited recovery is encountered. After three attempts, the corer will be repositioned approximately 3-5 feet parallel to the axis of the channel (in an area equally representative of material to be dredged) and penetration will be attempted again. If sufficient recovery cannot be attained after repositioning the corer three times, the Field Operations Manger will contact the EA Project Manager. The EA Project Manager will contact the USACE-Mobile District Project Manager to discuss re-locating the station.

Sampling will be dependent upon daily weather conditions (including heavy rain, high winds, lightning and/or fog), and severe weather forecasts may preclude sampling. The USACE – Norfolk District Technical Lead will be notified of weather-related delays by the Field Operations Manager.

EA is experienced with the logistics associated with coring activities in busy ports and harbors. The field operations staff is prepared to handle logistical challenges that may arise during the project. EA will report unanticipated logistical problems to the USACE – Mobile District Project Manager and will provide recommendations and/or modifications to the sampling program to achieve the project goals while adhering to the proposed schedule.

Note that there is no way to accurately predict every problem that may arise when in the field. Every effort will be taken to inform the USACE Technical Manager or the QA Manager of any changes in the sampling scheme prior to the change taking place. The contractor Project Manager and the Field Team Leader will be familiar with the project and project goals and make an educated, scientifically based decision on the change if the USACE Technical Manager, QA Manager, or the USEPA Project Manager cannot be contacted. Any deviation will be explained in the DQCR, the field sheet(s), and in the testing report.

10.4 Locating and Selecting Environmental Samples

USACE-Mobile chose sampling areas and the sample compositing scheme to appropriately characterize the proposed dredged material within the proposed widening area for the Bayou Casotte and Lower Pascagoula Sound Channels. Locations in the Pascagoula Bar Channel were chosen in shoaled areas, so the samples represent material most likely to be dredged during the next maintenance dredging cycle.

10.5 Classification of Measurements as Critical or Noncritical

Horizontal and vertical accuracy of the sampling locations is critical in that the locations must be within the dredging prism. Toxicology results are critical in determining the suitability of sediment for ocean placement.

10.6 Validation of Any Nonstandard Methods

No modifications to methods are expected for the field sampling and analytical testing for this project. Any modification will be coordinated and approved by the USACE-Mobile District and USEPA-Region 4 (if required) before implementation.

For the ecotoxicological testing, several testing modifications are proposed. In previous testing programs, water column toxicity tests conducted on elutriates prepared from sediment samples from similar locations were very sensitive. Therefore, an additional 1 percent dilution will be added to the dilution series, and will be used to assess the water column toxicity at low concentrations. The goal of this additional dilution is to increase the opportunity of calculating a Median Lethal Concentration/Median Effective Concentration (LC50/EC50).

Based on previous dredged material studies from Bayou Casotte/Pascagoula Sound Channels, ammonia will likely be the primary source of toxicity in *M. edulis* standard elutriate water column bioassays (EA 2006a and 2002). Therefore, two sets of water column bioassays will be conducted (side-by-side) for *M. edulis*: one test with an elutriate stripped of ammonia (reduced to less than 1 mg/L unionized ammonia) prior to test initiation and one test with untreated elutriate. These side-by-side tests will allow for identification of ammonia as the primary toxicant as opposed to other organic or inorganic contaminants.

Ammonia stripping of the elutriate samples will be accomplished by adjusting an aliquot of each elutriate sample to pH greater than 11.0 using sodium hydroxide, and aerating vigorously in a container with a large surface area to volume ratio. Samples will be aerated for a minimum of two hours, and the ammonia reduction will be monitored. At the end of the stripping period, the pH of each elutriate will be adjusted back to the original pH using hydrochloric acid, and ammonia concentrations will be measured. The ammonia concentrations will be reduced to a target concentration of less than 1.0 mg/L total ammonia.

11.0 ELEMENT B2 – SAMPLING AND METHODS REQUIREMENTS

11.1 Sample Collection, Preparation, and Decontamination Procedures

11.1.1 Field Sampling Schedule

It is expected that the field sampling for both the Pascagoula Harbor Navigation Channel Improvements project and Pascagoula Bar Channel project will be performed over the course of two weeks in April-May 2010. The proposed schedule is dependent on several factors including, but not limited to, weather conditions, equipment, and accessibility. The USACE – Mobile District project manager will be notified of weather-related delays by the Field Operations Manager. Contact with facilities in the immediate area and local security forces [e.g., United States Coast Guard (USCG)] will be coordinated prior to mobilizing to the field. Contact information for all parties involved as well as local facilities and security forces will be distributed to all parties and will be on hand onboard the sampling platform.

11.1.2 Field and Sampling Procedures

The sampling and analytical components (list of target analytes, target detection limits, methodologies, elutriate preparation procedures, and sample holding times) were derived from the following guidance documents:

- USEPA/USACE, 1998 (EPA-823-B-98-004). *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.-Testing Manual [Inland Testing Manual (ITM)]*.

- USEPA/USACE, 1991. *Evaluation of Dredged Material Proposal for Ocean Disposal, Testing Manual* (OTM) (commonly called “The Green Book”).

- USEPA/USACE, 2008. *Regional Implementation Manual, Requirements and Procedures for Evaluation of the Ocean Disposal of Dredged Material in Southeastern Atlantic and Gulf Coastal Waters* (SERIM).

- USEPA/USACE, 1995 (EPA-823-B-95-001). *QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations*.

- USEPA, 2001. *Methods for Collection, Storage, and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual.*

Target analytes, target detection limits, methodologies, elutriate preparation procedures, and sample holding times were consistent with previous sediment studies conducted for Pascagoula Harbor Channels (EA 2006a and 2002).

For each sample submitted for analytical and ecotoxicological testing, a total of approximately three gallons of sediment will be required for bulk sediment analysis, approximately two gallons of sediment will be required for the standard elutriate preparation, and approximately 25 gallons of sediment will be required for ecotoxicological testing. Therefore, a minimum of approximately 29 gallons of sediment will be required for each composite sample. Additional sediment volume will be required from one location for analysis of a field duplicate sample, and additional volume will be collected from one location for matrix spike (MS) and matrix spike duplicate (MSD) analyses.

For the water samples, approximately 2 gallons of site water are required for chemical analysis, approximately 3 gallons of site water are required for standard elutriate preparation, and approximately 15 gallons of site water will be required for ecotoxicological testing. Additional volume will also be collected for MS/MSD analysis. Therefore, in the Bayou Casotte Channel, approximately 95 gallons of water will be collected from one location. In Pascagoula Lower Sound, approximately 75 gallons of site water will be collected from one location. In the Pascagoula Bar Channel, approximately 40 gallons of water will be collected from one location.

11.1.3 Sample Position Accuracy

Sampling locations will be determined using a Trimble ProXRS Differential Global Positioning System (DGPS) with an accuracy of +/- 1 to 3 meters. Coordinates for this project are provided in Section 10.

11.1.4 *In Situ* Water Quality Measurements

Water quality measurements will be recorded *in situ* at each sampling location using an YSI water quality probe. Water temperature, salinity, dissolved oxygen, pH, and turbidity profiles will be recorded at each sampling location at 5-foot intervals. EA will document calibration procedures and QC checks for the YSI water quality probe. The following parameters will be recorded in the field log book:

- Location number
- Sampling data and time
- Water depth
- Water temperature [degrees Celsius (ºC)]
- Salinity (parts per thousand)
- Dissolved oxygen (milligrams per liter)
- pH
- Turbidity

11.1.5 Vibracore Sediment Sampling

Sediment samples in Bayou Casotte and Pascagoula Lower Sound Channels will be collected using a vibracoring system supplied by Construction Solutions International, Inc. (CSI). The vibracoring system uses a stainless steel core barrel capable of holding a core liner with an outside diameter of 3.0 in. Cellulose acetate butyrate (CAB) core liners with an inner diameter of 2.875 in. will be used for sampling.

Vibracoring will be conducted by placing a clean, CAB liner into the stainless steel barrel. The barrel will be lowered to the sediment surface and vibrated to the required depth. After the core has penetrated to a sufficient depth, the core barrel will be retrieved and brought onto the barge deck. The core liner will be removed from the steel barrel, capped at both ends, sealed, and labeled.

Cores will be kept on-board the barge in an insulated and cooled box until the end of each workday. Cores will then be transferred to a refrigeration unit located onshore at the project staging area.

11.1.6 Sediment Grab Sampling

Surficial sediment will be collected using a grab sampler at the two reference locations for the Pascagoula Harbor project, four sample locations for the Pascagoula Bar Channel project, and three locations at the Pascagoula ODMDS. The sediment samples will be collected using a large stainless steel Van Veen grab sampler which will be decontaminated prior to each station. Sampling positions will be recorded using a DGPS. Sediment samples will be obtained by taking sediment directly from the grab, homogenizing it in stainless steel bowls, and placing it directly into the appropriate laboratory jars. Samples will be submitted to the appropriate laboratories with chain-of-custody forms.

11.1.7 Site Water Collection

Site water samples will be collected within one meter of the bottom at each site water sampling location using an ISCO pump, except at the ODMDS location, where site water will be collected at least one meter below the water surface. Water samples will also be used for chemical analysis, elutriate preparation, and to create water column bioassays and whole sediment bioassays. A vertical profile (5-ft increments) of temperature, conductivity, pH, dissolved oxygen, and turbidity shall be recorded at each water sampling location using a YSI meter.

Water samples for chemical analysis and standard elutriate preparation will be collected at one Bayou Casotte location and one Pascagoula Lower Sound Channel. In addition, a placement site (receiving water) water sample will be collected from the Pascagoula ODMDS.

Water samples for chemical analysis and elutriate preparation will be collected at one Pascagoula Bar Channel location. The placement site (receiving water) water sample collected from the Pascagoula ODMDS for the Pascagoula Harbor Navigation Channel Improvements project will also be used for Pascagoula Bar Channel project.

11.1.8 Field Duplicates

A field duplicate is a separate sample collected in the field at the same time and place as a normal sample. Duplicates are utilized to determine the precision of field sampling and laboratory analytical activities. Field duplicates are also indicative of sample homogeneity. One field duplicate will be submitted for the Bayou Casotte/Pascagoula Lowe Sound Channel project, and one field duplicate will be submitted for the Pascagoula Bar Channel project.

11.1.9 Equipment Blanks

Equipment blanks are collected to determine the extent of contamination, if any, from the sampling equipment used as part of the project. Four equipment blanks will be collected for the Bayou Casotte/Pascagoula Lowe Sound Channel project – one for the grab sampler, one for the peristaltic pump tubing used to collect the site water, one for the vibracoring equipment that comes into direct contact with the sediment (stainless-steel nose cone and stainless-steel core liner catcher), and one for the core liner that holds the sediment cores. These equipment blanks will also serve as the equipment blanks for the Pascagoula Bar Channel project. Equipment blanks are collected by pouring deionized water, which is provided by EA's Ecotoxicology Laboratory, over sampling equipment that has been decontaminated using the procedure outlined in Section 11.1.10. The rinsate water is placed in laboratory-prepared containers, submitted to the analytical laboratory, and tested for the same chemical parameters as the sediments and site water.

11.1.10 Equipment Decontamination

Sampling apparatus used to collect sediment samples (core liners, Van Veen, stainless-steel bowls, stainless-steel spoons) will be decontaminated prior to use in the field and between sampling locations to minimize cross-contamination. Tubing used for water sampling will be cleaned by running water through the tubing for 1-2 minutes prior to the start of sample collection at each location. Also to avoid cross-contamination, disposable nitrile gloves will be worn by the sampling personnel and changed between sampling points. While performing the decontamination procedure, "phthalate-free gloves", such as nitrile, will be used in order to prevent phthalate contamination of the sampling equipment or the samples.

The decontamination procedure is described below:

- Rinse equipment using site water
- Rinse with 10 percent nitric acid (HNO_3)
- Rinse with distilled or de-ionized water
- Rinse with methanol followed by hexane
- Rinse with distilled or de-ionized water
- Air dry (in area not adjacent to the decontamination area)

Waste liquids will be contained during decontamination procedures and transferred to EA's facility in Sparks, Maryland, for disposal.

11.1.11 Core Processing

Sediment cores collected using the vibracoring unit will be processed in a designated area at EA's warehouse facility once the field sampling has been completed. Prior to processing, cores will be sorted according to sample location and checked against the chain-of-custody form. Sediments for each sample will be extracted from each core using a stainless steel extrusion rod, composited, and homogenized in clean 55 gallon fiberglass or stainless steel holding containers. Samples submitted for chemical analysis, elutriate preparation, and ecotoxicological analysis at each location will consist of composites of multiple cores from the same location or multiple locations (See Section 10.2 for compositing scheme). Sample processing equipment that comes into direct contact with the sediment will be decontaminated according to the protocols specified in the Section 11.1.10.

11.2 Identify Support Facilities for Sampling Methods

Coring operations will be conducted from a 120-ft spud barge positioned with a tugboat. The barge will be outfitted with a crane to lift the core barrel during coring operations. Barge, tugboat, crane equipment, and vibracoring system will be provided and operated by CSI.

11.3 Sampling/Measurement System Failure Response and Corrective Action Process

If core refusal or limited recovery is encountered during coring operations, a limited number of additional attempts will be made to obtain sufficient sample volume. Three additional attempts will be conducted at a single location if refusal or limited recovery is encountered. After three attempts, the corer will be repositioned approximately 3-5 feet parallel to the axis of the channel (in an area equally representative of material to be dredged) and penetration will be attempted again. If sufficient recovery cannot be attained after repositioning the corer three times, the Field Operations Manger will contact the EA Project Manager. The EA Project Manager will contact the USACE–Mobile District Project Manager to discuss re-locating the station.

11.4 Sampling Equipment, Sample Preservation, and Holding Times

Sampling equipment will be decontaminated before coming into contact with sample. Dedicated tubing will be used to collect site water samples.

Sampling containers, preservation techniques, and holding times for sediment and site water/elutriate samples are listed in Tables 11.1 and 11.2, respectively. All holding times and preservation techniques are in accordance with *QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations* (USEPA/USACE 1995). For sediments collected in core liners, holding times for the composite sediment samples from each location will begin when the sediment is composited, homogenized, and placed in the appropriate sample containers. For surface sediments and site water samples, holding times will begin at the time of sample collection.

Tissue samples will be held frozen until determination of target analytes through consultation with USACE-Mobile District and USEPA-Region 4. Tissue samples will be submitted to the analytical laboratory at the completion of the bioaccumulation tests.

Table 11.1 Required Containers, Preservation Techniques, and Holding Times for Sediment Samples[a]

Parameter	Volume Required [b]	Container [c]	Preservative	Holding Time
Inorganics				
Metals (including Mercury)	8 oz.	P,G	4ºC	6 months (28 days for Hg)
Cyanide	8 oz.	P,G	4ºC	14 days
Total Sulfide	(e)	P,G	4ºC	7 days
AVS/SEM	4 oz.	P,G	4ºC (no headspace)	14 days
Nitrogen, Ammonia Nitrogen, Nitrate + Nitrite	(e)	P,G	4ºC	28 days
Nitrogen (Total Kjeldahl), Total Phosphorus	4 oz.	P,G	4ºC	28 days
Physical Parameters				
Standard Elutriate Test [g]	2 x 1 gallon	G	4ºC	14 days until elutriate generation
Grain Size, Specific Gravity	32 oz.	P,G	4ºC	6 months
Percent Moisture	(d)	P,G	4ºC	6 months
Organics				
Total Organic Carbon	(d)	G	4ºC	14 days
Organochlorine Pesticides, Semivolatile Organics, PCB Congeners, and Polycyclic Aromatic Hydrocarbons	(d)	G	4ºC	14 days until extraction, 40 days after extraction
Butyltins	(f)	G	4ºC	14 days until extraction, 40 days after extraction
Dioxins / Furans	4 oz.	G	4ºC	1 year until extraction, 40 days after extraction
Ecotoxicological Testing				
Whole Sediment Bioassay and Bioaccumulation Testing	25 gallons	P	4ºC	Optimum 14 days, maximum 8 weeks

(a) From time of sample collection.
(b) Additional volume will need to be provided for samples designated as MS/MSDs.
(c) P=plastic; G=glass
(d) Can be taken from the 8 oz. noted for metals.
(e) Can be taken from the 8 oz. noted for cyanide.
(f) Can be taken from the 32 oz. for grain size.
(g) The sample for MS/MSD analysis will require 6 gallons of sediment for the standard elutriate generation.

Table 11.2 Required Containers, Preservation Techniques, and Holding Times for Site Water and Standard Elutriate Preparation Water[(a)]

Parameter	Volume Required [(b)]	Container [(c)]	Preservative	Holding Time
Inorganics				
Metals (including Mercury)	500 mLs	P	pH <2 with HNO_3, Cool, 4ºC	6 months (28 days for Hg)
Selenium	1 liter	P	4ºC	6 months
Cyanide	250 mLs	P,G	NaOH to pH >12, Cool, 4ºC	14 days
Total Sulfides	250 mLs	P,G	NaOH to pH >12, Zinc Acetate, Cool, 4ºC	7 days
Nitrogen, Ammonia	250 mLs	P,G	H_2SO_4 to pH <2, Cool, 4ºC	28 days
Nitrogen, Nitrate + Nitrite	250 mLs	P,G	4ºC	48 hrs
Nitrogen (Total Kjeldahl) Total Phosphorus	500 mLs	P,G	H_2SO_4 to pH<2, Cool, 4ºC	28 days
Physical Parameters				
Standard Elutriate Test [(d)]	3 gallons	G	4ºC	None specified
Ecotoxicological Testing				
Water Column Bioassays	5 x 3 gallon (15 gallons total)	P	4ºC	Elutriate from sediment prepared within 24 hours of test initiation
Organics				
Total Organic Carbon	2 x 40 mLs	G, teflon-lined, septa cap	H_2SO_4 or HCl to pH <2, Cool, 4ºC	28 days
Organochlorine Pesticides, Semivolatile Organics, PCB Congeners, PAHs	5 liters	G	4ºC	7 days until extraction, 40 days after extraction
Butyltins	2 liters	G	4ºC	7 days until extraction, 40 days after extraction
Dioxins / Furans	2 liters	G	4ºC	1 year until extraction, 40 days after extraction

(a) From time of sample collection.
(b) Additional volume will need to be provided for samples designated as MS/MSDs.
(c) P=plastic; G=glass
(d) The sample for MS/MSD analysis will require 9 gallons of site water for the standard elutriate generation

12.0 ELEMENT B3 – SAMPLE HOLDING AND CUSTODY REQUIREMENTS

All sample handling will be conducted according to the procedures and methods outlined in QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissue for Dredged Material Evaluations (USEPA 1995) and *Methods for Collection, Storage, and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual* (USEPA 2001).

Field notes will be recorded in a permanently bound, dedicated field logbook. A log of sampling activities, location coordinates, and water depths will be recorded in the log in indelible ink. In addition, water temperature, salinity, dissolved oxygen, and pH profiles (5-ft increments) will be measured and recorded at each sampling location using an electronic water quality monitoring instrument.

Personnel names, local weather conditions, and other information that may impact the field sampling program will also be recorded. Similar appropriate information will be recorded in this logbook as samples are processed and submitted to the laboratories for analyses. Each page of the logbook will be numbered and dated by the personnel entering information. Corrections to documentation will be made with a single line through the error with the author's initials and date. Copies of the logbooks will be filed at EA's office in Sparks, Maryland. Full copies of the project logbooks will be submitted as an appendix to the project report.

12.1 Sample Handling

12.1.1 Sample IDs

The sample numbering system will be used to communicate sample location and sample type between the field crew and the laboratory. Sample IDs contain information to indicate the channel where the sample was collected, using the following abbreviations:

Pascagoula Harbor project:

PLS	=	Pascagoula Lower Sound
BCW	=	Bayou Casotte
PH-REF-B	=	Pascagoula Harbor Reference (B or D)

Pascagoula Bar Channel project:

PB	=	Pascagoula Bar Channel

The location ID will be followed by one of the suffixes according to sample type:

- SED – sediment sample to be submitted for chemical and physical analyses
- SW – site water to be submitted for chemical analyses
- SET – water collected that will be used in the standard elutriate testing procedure
- EQB – equipment blank
- FD – field duplicate
- MS or MSD – matrix spike or matrix spike duplicate sample

For example, sample BCW-02-SED will signify the sediment composite sample that was collected from Bayou Casotte location 02. A summary of the sample IDs for the Pascagoula Harbor and Pascagoula Bar Channel samples are provided in Section 10.

12.1.2 Sample Labels

Sample containers for the processed sediment and water samples will be labeled with the following information:

- Client name/Project Name
- Project number
- Sample ID

- Sampling location
- Date and time of collection
- Sampler's initials
- Type of analyses required

12.2 Chain-of-Custody Requirements

Samples are physical evidence and will be handled according to certain procedural safeguards. For the purposes of legal proceedings, a showing to the court that the laboratory is a secure area may be all that is required for the analyzed evidence to be admitted. However, it is anticipated that in some cases, the court may require a showing of the hand-to-hand custody of the samples from sampling through disposal.

Although TestAmerica Pittsburgh is not involved in sampling activities, in the event that the court requires such a comprehensive chain-of-custody demonstration, the laboratory is prepared to produce documentation that traces the in-house custody of the samples from the time of receipt to the completion of the analysis.

The National Enforcement Investigations Center (NEIC) of USEPA defines custody of evidence in the following ways:

- It is in your actual possession: or
- It is in your view, after being in your physical possession; or
- It was in your possession and then you placed it in a secure area to prevent tampering; or
- It is in a secure area.

The chain-of-custody procedure begins with the preparation of the sample containers and preservatives to be used in sample collection. For this program, TestAmerica Pittsburgh purchases and distributes pre-cleaned sample containers with chemical preservatives. Vendors are required to provide documentation of analysis for each lot of containers, and the documentation is kept on file in the Sample Management Office.

Sample kits, which are coolers containing chain-of-custody (COC) forms, custody seals, sample containers, preservatives, and packing material, are prepared by the Sample Management Office.

The importance of sample labeling is critical to the success of this program. Improperly labeled samples lead to questions with regard to location, project, sampling station, date sampled and sampler. All of this information is essential for proper sample handling.

After the label has been completed and has been affixed to the sample container, the label is covered with clear tape. Pre-printed pressure-sensitive labels are supplied by TestAmerica Pittsburgh with the sample kits.

While in the field and processing core samples EA personnel will document sediment and site water samples collected on project-specific chain-of-custodies (COCs). This form provides sample-specific information and a listing of the parameters required on each sample. The chain-of-custody and appropriate field data sheets are sealed in a water-tight plastic bag and shipped with the samples to the laboratory. The COCs will accompany the samples to TestAmerica–Pittsburgh.

The laboratory has a designated Sample Management Officer. This individual is responsible for receiving samples in the laboratory, opening the coolers and checking the sample integrity and the custody seal, logging samples into the laboratory system, and controlling the handling and storage of samples while in the laboratory.

Upon receipt at the laboratory, the Sample Management Officer or designated custodian inspects the samples for integrity and checks the shipment against the chain-of-custody. Cooler temperatures are checked and documented on the laboratory's Cooler Receipt Form. The pH of preserved samples (except organics) is measured and documented on the Cooler Receipt Form, which are maintained in the project records. The pH of sample vials submitted for aqueous volatile organics determinations are checked by the analyst during analysis, and the pH is recorded in the instrument run logbook. Discrepancies are addressed at this point, documented on the Cooler Receipt Form, and resolved prior to laboratory analysis. When the shipment and the chain-of-custody are in agreement, the custodian enters the sample and analysis information into the laboratory computer system [Laboratory Information Management System (LIMS)] and assigns each sample a unique laboratory number.

This number is affixed to each sample bottle. The original of the chain-of-custody form is given to the data management group, the information it contains copied to the appropriate laboratory operation areas. These log-in procedures are documented in the sample management SOPs of each analytical laboratory.

12.3 Storage and Disposal of Samples

<u>12.3.1 Sample Storage</u>

Sediment samples, site water samples, equipment blanks, and elutriate preparation water will be stored in ice-filled coolers on the work platform until the end of each sampling day. Site water samples, reference sediment samples, and equipment blanks will be packaged in bubble wrap, placed in an ice-filled cooler, and shipped via overnight express to TestAmerica–Pittsburgh in Pittsburgh, Pennsylvania at the following address:

TestAmerica–Pittsburgh
301 Alpha Drive
Pittsburgh, PA. 15238
(412) 963-7058
Attn: Sample Receiving

Sediment cores, site water samples for ecotoxicological testing, and the effluent elutriate preparation water will be stored in a secured refrigeration truck at each staging area at the end of each sampling day. Bulk sediment samples from Bayou Casotte, Pascagoula Lower Sound, and Pascagoula Bar Channel and elutriate water will be shipped or hand-delivered to TestAmerica at the end of the project. Coolers (both shipped and hand-delivered) will have a copy of the COC form taped to the inside of the top lid.

While in the laboratory, the samples and aliquots that require storage at approximately 4ºC and are maintained in a secured refrigerator unless they are being used for analysis. Samples for purgeable organics determinations are stored in a secure refrigerator separate from other samples, sample extracts, and standards. All of the refrigerators in the laboratory used for storage of samples have restricted access, are numbered, and the actual storage location is indicated in the LIMS system. In addition, there are dedicated refrigerators for extracts and analytical standards. Samples (e.g. tissue) that are required to be frozen, are stored in a freezer. The sample storage areas are within the laboratory to which access is limited to laboratory chemists. Specific requirements for sample storage are the following:

- Samples are removed from the shipping container and stored in their original containers unless damaged.
- Damaged samples are disposed in an appropriate manner and this disposal is documented. EA will be notified whenever samples arrive damaged at the laboratory.
- Samples and extracts are stored in a secure area designed to comply with the storage method(s) defined in the contract.
- The storage area is kept secure at all times. The sample custodian controls access to the storage area.
- All transfers of samples into and out of storage are documented in an internal chain-of-custody record by the Sample Management Office. These internal custody records are maintained in the Project Records Office.
- Samples for Volatiles Organic Analysis are stored separately from the other samples.
- Standards are not stored with samples or sample extracts.

So that the laboratory may satisfy sample chain-of-custody requirements, the following standard operating procedures for laboratory/sample security are implemented:

- Samples are stored in a secure area.
- Access to the laboratory is through a monitored area. Other outside-access doors to the laboratory are kept locked.
- Visitors sign a visitor's log and are escorted while in the laboratory.

- Refrigerators, freezers, and other sample storage areas are securely maintained.

12.3.2 Sample Disposal

TestAmerica will retain all remaining unused sample volume under appropriate temperature and light conditions at least until the data generated from the samples goes through the contractor's QA/QC and is approved as acceptable. Archive samples will be retained until the final report is submitted to the USACE. Approval by the USACE Project Manager will be obtained prior to disposal of any sediment, water, or tissue sample if disposal is needed before the final report is submitted. Samples will be disposed of properly according to federal, state, and local laws.

13.0 ELEMENT B4 – ANALYTICAL METHODS REQUIREMENTS

This section details the types of documentation required to ensure the integrity of the data produced. Analytical support for these projects will be provided by TestAmerica-Pittsburgh, TestAmerica-Burlington (grain size, specific gravity, and butyltins), TestAmerica-North Canton (total phosphorus and TKN), TestAmerica-Knoxville (dioxins), and Brooks Rand (Selenium in water).

All inorganic and organic compounds for this project are determined using the methods listed below (also listed in Section 6.4.1), as described in the laboratory's analytical standard operating procedures (SOPs). To meet program specific regulatory requirements for chemicals of concern, all methods/SOPs are followed as stated with some specific requirements noted below.

The detection limit is a statistical concept that corresponds to the minimum concentration of an analyte above which the net analyte signal can be distinguished with a specified probability from the signal due to the noise inherent in the analytical system. The method detection limit (MDL) was developed by the USEPA, and is defined as "the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero" (40 CFR 136, Appendix B). Quantitation limits applicable to this project are listed in Tables 13.1, 13.2, and 13.3 below for sediment, aqueous, and tissue samples, respectively. The sediment and aqueous tables include the Target Detection Limits (TDLs) referenced in the *QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations – Chemical Evaluations* (EPA 823-B-95-001, April 1995). All analytical parameters, except Wet Chemistry parameters, geotechnical parameters, and butyltins, will be quantitated to the MDL. All detected values greater than or equal to the MDL but less than the laboratory reporting limit (RL) will be qualified as estimated. Wet Chemistry parameters, geotechnical parameters, and butyltins will be quantitated to the laboratory reporting limit.

The laboratory RL and MDL exceed the requested TDL for toxaphene in the sediment. The laboratory RL and MDL exceed the requested TDL for tributyltin in the aqueous matrices.

For sediment analyses, sample weight will be adjusted for percent moisture (up to 50 percent moisture) for the following parameters prior to extraction or digestion to achieve the lowest possible reporting limits: semivolatiles, PCB congeners, chlorinated pesticides, organophosphorus pesticides, metals (6020), mercury (7471A), and dioxins/furans.

A SOP is a written step-by-step description of laboratory operating procedures exclusive of analytical methods. Laboratories providing analytical support for this project are required to document all procedures in formal, approved SOPs. Copies of the SOPs can be provided upon request. The SOPs must address the following areas:

- Storage containers and sample preservatives
- Sample receipt and logging
- Sample custody
- Sample handling procedures
- Sample transportation
- Glassware cleaning
- Laboratory security
- Quality control procedures and criteria
- Equipment calibration and maintenance
- Documentation
- Safety
- Data handling procedures
- Document control
- Personnel training and documentation
- Sample and extract storage
- Preventing sample contamination
- Traceability of standards
- Data reduction and validation
- Maintaining instrument records and logbooks

- Nonconformance
- Corrective actions
- Records management

13.1 Physical and Chemical Analysis of Sediments

TOC in sediments will be determined using the 1988 USEPA-Region II combustion oxidation procedure (referred to as Lloyd Kahn procedure).

The AVS and SEM determinations will be performed following the procedures specified in the USEPA April 1991 *Draft Analytical Method for the Determination of Acid Volatile Sulfide in Sediment*. The SEMs that will be determined are cadmium, copper, lead, nickel, and zinc. The reported values for both AVS and SEM will be in umoles/gram.

Table 13.1 RLs, MDLs, and TDLs for Sediment Samples

Semivolatiles, ITM List (Low Level SW846 8270C)	Laboratory RL (µg/kg)	Laboratory MDL (µg/kg)	TDL (SERIM, 2008) (µg/kg)
Acenaphthene	6.7	1.07	20
Acenaphthylene	6.7	1.33	20
Anthracene	6.7	1.17	20
Benzo(a)anthracene	6.7	1.06	20
Benzo(b)fluoranthene	6.7	1.35	20
Benzo(k)fluoranthene	6.7	1.39	20
Benzoic acid	170	1.11	--
Benzo(ghi)perylene	6.7	0.49	20
Benzo(a)pyrene	6.7	1.87	20
Benzyl alcohol	33	3.39	--
bis(2-Chloroethoxy)methane	33	1.34	--
bis(2-Chloroethyl) ether	6.7	0.585	--
bis(2-Ethylhexyl) phthalate	33	2.82	--
4-Bromophenyl phenyl ether	33	1.42	--
Butyl benzyl phthalate	33	2.33	--
4-Chloro-3-methylphenol	33	0.995	--
2-Chloronaphthalene	6.7	0.901	--
2-Chlorophenol	33	1.03	--
4-Chlorophenyl phenyl ether	33	1.47	--
Chrysene	6.7	1.17	20
Dibenzo(a,h)anthracene	6.7	1.47	20
Dibenzofuran	33	1.13	--
Di-n-butyl phthalate	33	1.86	--
3,3'-Dichlorobenzidine	33	6.30	--
2,4-Dichlorophenol	6.7	1.35	--
Diethyl phthalate	33	1.89	--
2,4-Dimethylphenol	33	1.40	--
Dimethyl phthalate	33	1.12	--
4,6-Dinitro-2-methylphenol	170	32.1	--
2,4-Dinitrophenol	170	10.7	--
2,4-Dinitrotoluene	33	1.56	--
2,6-Dinitrotoluene	33	1.70	--
Di-n-octyl phthalate	33	0.859	--

Semivolatiles, ITM List (Low Level SW846 8270C)	**Laboratory RL (µg/kg)**	**Laboratory MDL (µg/kg)**	**TDL (SERIM, 2008) (µg/kg)**
1,2-Diphenylhydrazine	6.7	1.39	--
Fluoranthene	6.7	0.563	20
Fluorene	6.7	1.01	20
Hexachlorobenzene	6.7	1.26	--
Hexachlorobutadiene	6.7	1.42	--
Hexachlorocyclopentadiene	33	1.27	--
Hexachloroethane	33	1.13	--
Indeno(1,2,3-cd)pyrene	6.7	0.367	20
Isophorone	33	1.30	--
2-Methylnaphthalene	6.7	1.31	20
1-Methylnaphthalene	6.7	1.01	20
2-Methylphenol	33	1.23	--
4-Methylphenol	33	1.46	--
Naphthalene	6.7	0.969	20
Nitrobenzene	6.7	1.68	--
2-Nitrophenol	33	1.27	--
4-Nitrophenol	170	19.7	--
N-Nitrosodimethylamine	6.7	1.37	--
N-Nitrosodiphenylamine	6.7	1.37	--
N-Nitrosodi-n-propylamine	6.7	1.85	--
2,2'-oxybis(1-Chloropropane)	6.7	1.46	--
Pentachlorophenol	33	5.79	10
Phenanthrene	6.7	0.796	20
Phenol	6.7	1.33	--
Pyrene	6.7	1.77	20
1,2,4-Trichlorobenzene	6.7	0.840	--
2,4,6-Trichlorophenol	33	1.66	--
Chlorinated Pesticides, ITM List (SW846 8081A)	**Laboratory RL (µg/kg)**	**Laboratory MDL (µg/kg)**	**TDL (SERIM, 2008) (µg/kg)**
Aldrin	1.7	0.298	10
alpha-BHC	1.7	0.271	10
beta-BHC	1.7	0.433	10
delta-BHC	1.7	0.255	10
gamma-BHC (Lindane)	1.7	0.293	10
Chlordane (technical)	17	0.735	10
Chlorobenside	3.3	0.869	--
DCPA	3.3	0.452	--
4,4'-DDD	1.7	0.218	10
4,4'-DDE	1.7	0.252	10
4,4'-DDT	1.7	0.249	10
Dieldrin	1.7	0.278	10
Endosulfan I	1.7	0.313	10
Endosulfan II	1.7	0.294	10
Endosulfan sulfate	1.7	0.174	10
Endrin	1.7	0.323	10

Chlorinated Pesticides, ITM List (SW846 8081A)	**Laboratory RL (µg/kg)**	**Laboratory MDL (µg/kg)**	**TDL (SERIM, 2008) (µg/kg)**
Endrin aldehyde	1.7	0.324	10
Heptachlor	1.7	0.371	10
Heptachlor epoxide	1.7	0.325	10
Methoxychlor	3.3	0.348	10
Mirex	1.7	0.154	--
Toxaphene	67	11.1	10
PCB Congeners, ITM List (SW846 8082)	**Laboratory RL (µg/kg)**	**Laboratory MDL (µg/kg)**	**TDL (SERIM, 2008) (µg/kg)**
PCB 8 (BZ)	0.17	0.0347	1
PCB 18 (BZ)	0.17	0.0229	1
PCB 28 (BZ)	0.17	0.0375	1
PCB 44 (BZ)	0.17	0.0344	1
PCB 49 (BZ)	0.17	0.0353	1
PCB 52 (BZ)	0.17	0.0333	1
PCB 66 (BZ)	0.17	0.0274	1
PCB 77 (BZ)	0.17	0.0365	1
PCB 87 (BZ)	0.17	0.0312	1
PCB 90 (BZ)	0.17	0.0256	--
PCB 105 (BZ)	0.17	0.0350	1
PCB 101 (BZ)	0.17	0.0337	1
PCB 118 (BZ)	0.17	0.0341	1
PCB 126 (BZ)	0.17	0.0439	1
PCB 128 (BZ)	0.17	0.0343	1
PCB 138 (BZ)	0.17	0.0359	1
PCB 153 (BZ)	0.17	0.0348	1
PCB 156 (BZ)	0.17	0.0339	1
PCB 169 (BZ)	0.17	0.0329	1
PCB 170 (BZ)	0.17	0.0344	1
PCB 180 (BZ)	0.17	0.0342	1
PCB 183 (BZ)	0.17	0.0333	1
PCB 184 (BZ)	0.17	0.0288	1
PCB 187 (BZ)	0.17	0.0354	1
PCB 195 (BZ)	0.17	0.0338	1
PCB 206 (BZ)	0.17	0.0335	1
PCB 209 (BZ)	0.17	0.0359	1
Metals, ITM List (SW846 6020/7471A)	**Laboratory RL (mg/kg)**	**Laboratory MDL (mg/kg)**	**TDL (SERIM, 2008) (mg/kg)**
Aluminum	3	0.285	--
Antimony	0.2	0.0026	--
Arsenic	0.1	0.0181	1
Beryllium	0.1	0.0075	--
Cadmium	0.1	0.007	0.1
Chromium	0.2	0.0061	1
Cobalt	0.05	0.0015	--
Copper	0.2	0.033	1

Metals, ITM List (SW846 6020/7471A)	**Laboratory RL (mg/kg)**	**Laboratory MDL (mg/kg)**	**TDL (SERIM, 2008) (mg/kg)**
Iron	5	0.354	--
Lead	0.1	0.0038	0.5
Manganese	0.05	0.0103	--
Mercury	0.033	0.0109	0.05
Nickel	0.1	0.0113	1
Selenium	0.5	0.0502	1
Silver	0.1	0.0039	0.2
Thallium	0.1	0.002	--
Tin	0.5	0.0593	--
Zinc	0.5	0.0648	1
Nutrients	**Laboratory RL (mg/kg)**	**Laboratory MDL (mg/kg)**	**TDL (SERIM, 2008) (mg/kg)**
Cyanide (SW846 9012A)	0.5	0.105	--
Sulfide (SW846 9030B/9034)	30	12.3	--
Ammonia (EPA 350.1)	5	0.903	--
Nitrate (EPA 353.2)	1	0.052	--
Nitrite (EPA 353.2)	1	0.052	--
Total Organic Carbon (Lloyd Kahn)	500	57.1	1000
Phosphorus (SM 4500 P E)	10	2.4	--
Total Kjeldahl Nitrogen (SM 4500 NH3 E)	150	23	--
AVS/SEM (USEPA Draft 1991)	**Laboratory RL (umoles/gm)**	**Laboratory MDL (umoles/gm)**	**TDL (SERIM, 2008) (umoles/gm)**
Acid Volatile Sulfide	0.499	0.155	--
Cadmium	0.00111	0.000036	--
Copper	0.00984	0.000883	--
Lead	0.000724	0.000239	--
Mercury	0.0000623	0.0000065	--
Nickel	0.0170	0.00049	--
Zinc	0.0382	0.00283	--
Butyltins (TA SOP)	**Laboratory RL (ug/kg)**	**Laboratory MDL (ug/kg)**	**TDL (SERIM, 2008) (ug/kg)**
Monobutyltin	5	1.2	10
Dibutyltin	1.3	0.34	10
Tributyltin	1.5	0.37	10
Tetrabutyltin	1.7	0.45	--

Dioxins/Furans (EPA 1613B)	Laboratory Minimum Levels (pg/g)	TDL (SERIM, 2008) (pg/g)
2,3,7,8-TCDD	1	--
2,3,7,8-TCDF	1	--
1,2,3,7,8-PeCDD	5	--
1,2,3,7,8-PeCDF	5	--
2,3,4,7,8-PeCDF	5	--
1,2,3,4,7,8-HxCDD	5	--
1,2,3,6,7,8-HxCDD	5	--
1,2,3,7,8,9-HxCDD	5	--
1,2,3,4,7,8-HxCDF	5	--
1,2,3,6,7,8-HxCDF	5	--
2,3,4,6,7,8-HxCDF	5	--
1,2,3,7,8,9-HxCDF	5	--
1,2,3,4,6,7,8-HpCDD	5	--
1,2,3,4,6,7,8-HpCDF	5	--
1,2,3,4,7,8,9-HpCDF	5	--
OCDD	10	--
OCDF	10	--

13.2 Chemical Analysis of Site Water and Standard Elutriates

Standard elutriates will be prepared for the Bayou Casotte, Pascagoula Lower Sound, and Pascagoula Bar Channel projects. A standard elutriate is used to predict the release of contaminants to the water column resulting from open water disposal of dredged material. The dredged material and site water are combined in a sediment-to-water ratio of 1:4 on a volume basis. The mixture is vigorously mixed for 30 minutes and allowed to settle for 1 hour. The supernatant (liquid phase) is siphoned off and centrifuged to remove particulates. The liquid phase after centrifugation is the standard elutriate.

Table 13.2 RLs, MDLs, and TDLs for Site Water and Elutriate Samples

Semivolatiles, ITM (Low Level SW846 8270C)	Laboratory RL (µg/L)	Laboratory MDL (µg/L)	TDL (SERIM, 2008) (µg/L)
Acenaphthene	0.2	0.0144	--
Acenaphthylene	0.2	0.0085	--
Anthracene	0.2	0.0086	--
Benzo(a)anthracene	0.2	0.0176	--
Benzo(b)fluoranthene	0.2	0.0163	--
Benzo(k)fluoranthene	0.2	0.0164	--
Benzoic acid	5	0.524	--
Benzo(ghi)perylene	0.2	0.00866	--
Benzo(a)pyrene	0.2	0.0117	--
Benzyl alcohol	1	0.104	--
bis(2-Chloroethoxy)methane	1	0.0137	--
bis(2-Chloroethyl) ether	0.2	0.0264	--
bis(2-Ethylhexyl) phthalate	1	0.0462	--
4-Bromophenyl phenyl ether	1	0.0188	--
Butyl benzyl phthalate	1	0.306	--
4-Chloro-3-methylphenol	1	0.0254	--

Semivolatiles, ITM (Low Level SW846 8270C)	Laboratory RL (µg/L)	Laboratory MDL (µg/L)	TDL (SERIM, 2008) (µg/L)
2-Chloronaphthalene	0.2	0.0151	--
2-Chlorophenol	1	0.0211	--
4-Chlorophenyl phenyl ether	1	0.0104	--
Chrysene	0.2	0.0108	--
Dibenzo(a,h)anthracene	0.2	0.0128	--
Dibenzofuran	1	0.0185	--
Di-n-butyl phthalate	1	0.0299	--
3,3'-Dichlorobenzidine	1	0.0361	--
2,4-Dichlorophenol	0.2	0.0135	--
Diethyl phthalate	1	0.0449	--
2,4-Dimethylphenol	1	0.008	--
Dimethyl phthalate	1	0.014	--
4,6-Dinitro-2-methylphenol	5	0.780	--
2,4-Dinitrophenol	5	0.614	--
2,4-Dinitrotoluene	1	0.0165	--
2,6-Dinitrotoluene	1	0.0191	--
Di-n-octyl phthalate	1	0.0156	--
1,2-Diphenylhydrazine	0.2	0.0099	--
Fluoranthene	0.2	0.01	--
Fluorene	0.2	0.0099	--
Hexachlorobenzene	0.2	0.0182	--
Hexachlorobutadiene	0.2	0.0121	--
Hexachlorocyclopentadiene	1	0.0115	--
Hexachloroethane	1	0.0077	--
Indeno(1,2,3-cd)pyrene	0.2	0.0161	--
Isophorone	1	0.0289	--
2-Methylnaphthalene	0.2	0.0157	--
1-Methylnaphthalene	0.2	0.0174	--
2-Methylphenol	1	0.014	--
4-Methylphenol	1	0.0177	--
Naphthalene	0.2	0.0279	--
Nitrobenzene	0.2	0.018	--
2-Nitrophenol	1	0.014	--
4-Nitrophenol	5	0.703	--
N-Nitrosodimethylamine	0.2	0.0489	--
N-Nitrosodiphenylamine	0.2	0.0489	--
N-Nitrosodi-n-propylamine	0.2	0.0386	--
2,2'-oxybis(1-Chloropropane)	0.2	0.0347	--
Pentachlorophenol	1	0.188	10
Phenanthrene	0.2	0.0284	--
Phenol	0.2	0.0237	--
Pesticides, ITM List (SW846 8081A)	**Laboratory RL (µg/L)**	**Laboratory MDL (µg/L)**	**TDL (SERIM, 2008) (µg/L)**
Pyrene	0.2	0.0111	--
1,2,4-Trichlorobenzene	0.2	0.0461	--
2,4,6-Trichlorophenol	1	0.0091	--
Aldrin	0.0013	0.00083	0.5

Pesticides, ITM List (SW846 8081A)	**Laboratory RL (µg/L)**	**Laboratory MDL (µg/L)**	**TDL (SERIM, 2008) (µg/L)**
alpha-BHC	0.0013	0.00066	--
beta-BHC	0.0013	0.001	--
delta-BHC	0.0013	0.00044	--
gamma-BHC (Lindane)	0.0013	0.0008	--
Chlordane (technical)	0.0125	0.00165	0.05
Chlorobenside	0.0032	0.00148	--
DCPA	0.0025	0.00034	--
4,4'-DDD	0.0013	0.00067	0.1
4,4'-DDE	0.0013	0.00079	0.1
4,4'-DDT	0.0013	0.00074	0.1
Dieldrin	0.0013	0.00082	0.5
Endosulfan I	0.0013	0.00094	0.03
Endosulfan II	0.0013	0.00098	0.03
Endosulfan sulfate	0.0013	0.00057	0.03
Endrin	0.0013	0.00096	0.03
Endrin aldehyde	0.0013	0.0009	0.03
Heptachlor	0.0013	0.00099	0.05
Heptachlor epoxide	0.0013	0.00097	0.05
Methoxychlor	0.0025	0.00091	--
Mirex	0.0013	0.00048	--
Toxaphene	0.0013	0.00069	0.2
PCB Congeners, ITM List (SW846 8082)	**Laboratory RL (ng/L)**	**Laboratory MDL (ng/L)**	**TDL (SERIM, 2008) (ng/L)**
PCB 8 (BZ)	1	0.441	--
PCB 18 (BZ)	1	0.480	--
PCB 28 (BZ)	1	0.432	--
PCB 44 (BZ)	1	0.436	--
PCB 49 (BZ)	1	0.449	--
PCB 52 (BZ)	1	0.431	--
PCB 66 (BZ)	1	0.505	--
PCB 77 (BZ)	1	0.441	--
PCB 87 (BZ)	1	0.407	--
PCB 90 (BZ)	1	0.776	--
PCB 101 (BZ)	1	0.413	--
PCB 105 (BZ)	1	0.383	--
PCB 118 (BZ)	1	0.532	--
PCB 126 (BZ)	1	0.393	--
PCB 128 (BZ)	1	0.356	--
PCB 138 (BZ)	1	0.338	--
PCB 153 (BZ)	1	0.392	--
PCB 156 (BZ)	1	0.374	--
PCB 169 (BZ)	1	0.429	--
PCB 170 (BZ)	1	0.368	--
PCB 180 (BZ)	1	0.364	--
PCB 183 (BZ)	1	0.372	--
PCB 184 (BZ)	1	0.423	--
PCB 187 (BZ)	1	0.394	--

PCB Congeners, ITM List (SW846 8082)	**Laboratory RL (ng/L)**	**Laboratory MDL (ng/L)**	**TDL (SERIM, 2008) (ng/L)**
PCB 195 (BZ)	1	0.393	--
PCB 206 (BZ)	1	0.383	--
PCB 209 (BZ)	1	0.438	--
Metals, ITM List (SW846 6020/7470A)	**Laboratory RL (µg/L)**	**Laboratory MDL (µg/L)**	**TDL (SERIM, 2008) (µg/L)**
Aluminum	30	2.57	--
Antimony	2	0.0187	--
Arsenic	1	0.291	1
Beryllium	1	0.0367	--
Cadmium	1	0.114	1
Chromium	2	0.543	1
Cobalt	0.5	0.0263	--
Copper	2	0.244	1
Iron	50	6.09	--
Lead	1	0.0192	1
Manganese	0.5	0.0389	--
Mercury	0.2	0.0384	0.2
Nickel	1	0.175	1
Selenium	--	0.008	2
Silver	1	0.0362	1
Thallium	1	0.0152	--
Tin	5	1.51	--
Zinc	5	0.961	1
Cyanide (SW846 9012A)	10	1.6	10
Nutrients	**Laboratory RL (mg/L)**	**Laboratory MDL (mg/L)**	**TDL (SERIM, 2008) (mg/L)**
Sulfide (SW846 9030B/9034)	3	1.23	
Ammonia (EPA 350.1)	0.1	0.00943	0.03
Nitrate (EPA 353.2)	0.1	0.0052	--
Nitrite (EPA 353.2)	0.1	0.0052	--
Total Organic Carbon (SM 5310B)	1	0.140	--
Phosphorus (SM 4500 P E)	0.1	0.03	--
Total Kjeldahl Nitrogen (SM 4500 NH3 E)	3	2	--
Butyltins (TA SOP)	**Laboratory RL (µg/L)**	**Laboratory MDL (µg/L)**	**TDL (SERIM, 2008) (µg/L)**
Monobutyltin	0.5	0.16	--
Dibutyltin	0.039	0.02	--
Tributyltin	0.045	0.023	0.01
Tetrabutyltin	0.05	0.03	--

Dioxins/Furans (EPA 1613B)	Laboratory Minimum Levels (pg/L)	TDL (SERIM, 2008) (pg/L)
2,3,7,8-TCDD	10	--
2,3,7,8-TCDF	10	--
1,2,3,7,8-PeCDD	50	--
1,2,3,7,8-PeCDF	50	--
2,3,4,7,8-PeCDF	50	--
1,2,3,4,7,8-HxCDD	50	--
1,2,3,6,7,8-HxCDD	50	--
1,2,3,7,8,9-HxCDD	50	--
1,2,3,4,7,8-HxCDF	50	--
1,2,3,6,7,8-HxCDF	50	--
2,3,4,6,7,8-HxCDF	50	--
1,2,3,7,8,9-HxCDF	50	--
1,2,3,4,6,7,8-HpCDD	50	--
1,2,3,4,6,7,8-HpCDF	50	--
1,2,3,4,7,8,9-HpCDF	50	--
OCDD	100	--
OCDF	100	--

13.3 Chemical Analysis of Tissues

Tissues will be analyzed as part of the project. The tissues will include clam and worms resulting from bioaccumulation testing conducted by EA Engineering, Science & Technology. The final testing regime will be determined based on the bulk sediment results, but is expected to include, at a minimum, metals and lipids. Tissue samples will be stored frozen and removed to thaw prior to analysis.

Table 13.3 RLs and MDLs for Tissue Samples

PAHs, Low Level (SW846 8270C)	Laboratory RL (µg/kg)	Laboratory MDL (µg/kg)
Acenaphthene	6.7	1.72
Acenaphthylene	6.7	1.93
Anthracene	6.7	1.88
Benzo(a)anthracene	6.7	1.31
Benzo(b)fluoranthene	6.7	1.28
Benzo(k)fluoranthene	6.7	1.06
Benzo(ghi)perylene	6.7	1.13
Benzo(a)pyrene	6.7	1.02
Chrysene	6.7	1.31
Dibenzo(a,h)anthracene	6.7	2.10
Fluoranthene	6.7	2.14
Fluorene	6.7	1.61
Indeno(1,2,3-cd)pyrene	6.7	1.18
Naphthalene	6.7	1.61
Phenanthrene	6.7	1.59
Pyrene	6.7	2.03
Pesticides, ITM (SW846 8081A)	**Laboratory RL (µg/kg)**	**Laboratory MDL (µg/kg)**
Aldrin	1.7	0.177

Pesticides, ITM (SW846 8081A)	**Laboratory RL (µg/kg)**	**Laboratory MDL (µg/kg)**
alpha-BHC	1.7	0.254
beta-BHC	1.7	0.196
delta-BHC	1.7	0.176
gamma-BHC (Lindane)	1.7	0.231
Chlordane (technical)	17	3.87
Chlorobenside	3.3	1.18
DCPA	3.3	1.52
4,4'-DDD	1.7	0.149
4,4'-DDE	1.7	0.100
4,4'-DDT	1.7	0.228
Dieldrin	1.7	0.124
Endosulfan I	1.7	0.174
Endosulfan II	1.7	0.384
Endosulfan sulfate	1.7	0.270
Endrin	1.7	0.133
Endrin aldehyde	1.7	0.211
Heptachlor	1.7	0.213
Heptachlor epoxide	1.7	0.167
Methoxychlor	3.3	0.693
Mirex	1.7	1.20
Toxaphene	67	11.6
PCB Congeners, ITM List (SW846 8082)	**Laboratory RL (µg/kg)**	**Laboratory MDL (µg/kg)**
PCB 8 (BZ)	2	0.729
PCB 18 (BZ)	2	0.747
PCB 28 (BZ)	2	0.832
PCB 44 (BZ)	2	0.823
PCB 49 (BZ)	2	0.670
PCB 52 (BZ)	2	0.704
PCB 66 (BZ)	2	0.826
PCB 77 (BZ)	2	0.576
PCB 87 (BZ)	2	0.626
PCB 90 (BZ)	2	1
PCB 101 (BZ)	2	0.636
PCB 105 (BZ)	2	0.754
PCB 118 (BZ)	2	0.749
PCB 126 (BZ)	2	0.653
PCB 128 (BZ)	2	0.588
PCB 138 (BZ)	2	0.537
PCB 153 (BZ)	2	0.547
PCB 156 (BZ)	2	0.454
PCB 169 (BZ)	2	0.592
PCB 170 (BZ)	2	0.600
PCB 180 (BZ)	2	0.937
PCB 183 (BZ)	2	0.848
PCB 184 (BZ)	2	0.550
PCB 187 (BZ)	2	0.581

PCB Congeners, ITM List (SW846 8082)	**Laboratory RL (µg/kg)**	**Laboratory MDL (µg/kg)**
PCB 195 (BZ)	2	0.688
PCB 206 (BZ)	2	0.789
PCB 209 (BZ)	2	0.742
Metals, ITM List (SW846 6020/7471A)	**Laboratory RL (mg/kg)**	**Laboratory MDL (mg/kg)**
Aluminum	3	0.236
Antimony	0.2	0.0033
Arsenic	0.1	0.0165
Beryllium	0.1	0.0037
Cadmium	0.1	0.0091
Chromium	0.2	0.008
Cobalt	0.05	0.0025
Copper	0.2	0.0085
Iron	5	0.289
Lead	0.1	0.0034
Manganese	0.05	0.0145
Mercury	0.033	0.0109
Nickel	0.1	0.0068
Selenium	0.5	0.0406
Silver	0.1	0.0024
Thallium	0.1	0.002
Tin	0.5	0.106
Zinc	0.5	0.0117
Dioxins/Furans (EPA 1613)	**Laboratory RL (ng/kg)**	**Laboratory MDL (ng/kg)**
2,3,7,8-TCDD	2	10
1,2,3,7,8-PECDD	10	2.5
1,2,3,4,7,8-HXCDD	10	5
1,2,3,6,7,8-HXCDD	10	5
1,2,3,7,8,9-HXCDD	10	5
1,2,3,4,6,7,8-HPCDD	10	5
OCDD	20	10
2,3,7,8-TCDF	2	1
1,2,3,7,8-PECDF	10	2.5
2,3,4,7,8-PECDF	10	2.5
1,2,3,4,7,8-HXCDF	10	5
1,2,3,6,7,8-HXCDF	10	5
2,3,4,6,7,8-HXCDF	10	5
1,2,3,7,8,9-HXCDF	10	5
1,2,3,4,6,7,8-HPCDF	10	5
1,2,3,4,7,8,9-HPCDF	10	5
OCDF	20	10
Lipids	**Laboratory RL (%)**	**Laboratory MDL (%)**
Percent Lipids (TA SOP)	0.1	0.0296

13.4 Ecotoxicological Testing

Toxicity testing will be performed at EA's Ecotoxicology Laboratory in Sparks, Maryland, and will follow EA's protocols (EA 2006b) outlined in the Ecotoxicology QAPP. These protocols are consistent with the following guidance documents:

- USEPA/USACE, 1998 (EPA-823-B-98-004). *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.-Testing Manual (Inland Testing Manual* - ITM*).*

- USEPA/USACE, 1991. *Evaluation of Dredged Material Proposal for Ocean Disposal, Testing Manual*-OTM, commonly called "The Green Book".

- USEPA/USACE, 1995 (EPA-823-B-95-001). *QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations*.

- USEPA, 2002b. *Methods for measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

- USEPA Region IV/USACE-SAD, 2008. *Regional Implementation Manual, Requirements and Procedures for Evaluation of the Ocean Disposal of Dredged Material in Southeastern Atlantic and Gulf Coastal Waters* (RIM).

13.4.1 Water Column Bioassays

Dilution water for bioassays will consist of clean, uncontaminated seawater or an artificial sea salt mixture that does not exceed USEPA water quality criteria for marine species. Elutriate preparation procedures using site water are provided in the Ecotoxicology QAPP.

As per SERIM guidance, three species of organisms - *Americamysis bahia* (opossum shrimp), *Menidia menidia* (silverside), and *Mytilus edulis* (blue mussel) - will be tested in the water column bioassays for the Pascagoula Harbor and Pascagoula Bar Channel sediment samples. The three species chosen represent different phyla and cover a range of differing species sensitivities (USEPA/USACE 1998). Water column bioassays will be conducted for 96-hours using *Americamysis bahia* (opossum shrimp), and *Menidia menidia* (silverside). The water column bioassays conducted with the blue mussel (*Mytilus edulis*) will be 48-hour bioassays.

In the water column tests, survival will be the endpoint for the *A. bahia* and *M. menidia* tests. The endpoint of the *M. edulis* test will be normal shell development. As a worst case assessment, all water column tests will be conducted with larval or juvenile tests organisms which are considered the most sensitive life stage. The age ranges as specified by the USEPA/USACE (2008) testing guidelines are: *A. bahia* (1-5 days old), *M. menidia* (9-14 days old), and *M. edulis* (less than 4 hour embryos). In water column tests, results for 100 percent test elutriates will be statistically compared (single-point comparison) to results of the laboratory controls as per *ITM*/*SERIM* evaluation protocols, not to the results for the placement site or reference area.

Water column toxicity tests will be performed on three composite samples from the Pascagoula Lower Sound Channel, six individual samples from Bayou Casotte, and two composite samples from Pascagoula Bar Channel. In previous testing programs, water column toxicity tests conducted on elutriates prepared from similar sediment samples have proven to be very sensitive. Therefore, an additional 1 percent dilution will be added to the dilution series (10, 50 and 100 percent elutriate solutions) used to assess the water column toxicity of samples from the Pascagoula Lower Sound/Bayou Casotte and Pascagoula Bar Channels. The goal of this additional dilution is to increase the accuracy of calculating an LC50/EC50. For each site water sample, one additional water column test will be performed with each test species to evaluate the potential for site water toxicity.

Based on previous water column toxicity studies, ammonia may be the primary source of toxicity in the standard elutriate water column bioassays with the blue mussel, *M. edulis* (EA 2008, 2006a, 2005, and 2002). Therefore, two sets of water column bioassays will be conducted (side-by-side) for *M. edulis*: one test with an elutriate stripped of ammonia (reduced to less than 1 mg/L unionized ammonia) prior to test initiation and one test with an untreated elutriate. These side-by-side tests will allow for identification of ammonia as the primary toxicant as opposed to other organic or inorganic contaminants.

Ammonia stripping of the elutriate samples will be accomplished by adjusting an aliquot of each elutriate sample to pH greater than 11.0 using sodium hydroxide, and aerating vigorously in a container with a large surface area to volume ratio. Samples will be aerated for a minimum of two hours, and the ammonia reduction will be monitored. At the end of the stripping period, the pH of each elutriate will be adjusted back to the original pH using hydrochloric acid, and ammonia concentrations will be measured. The ammonia concentrations will be reduced to a target concentration of less than 1.0 mg/L unionized. Ammonia concentrations will be measured and recorded for the non-stripped and stripped elutriates.

Quality Control Procedures for Water Column Bioassays

Reference toxicants serve as internal quality control checks on technical performance, and are used to determine the condition of test organisms at the time of the bioassay. The reference toxicant tests are conducted in a manner that allows for comparison between lots or cultures of organisms. The results of each test are compared with the historical toxicological data generated for the specific combination of test species, test conditions, and reference toxicant. If resistance is reduced or elevated, the test organisms are examined to ascertain problems. More information about the reference toxicant testing is presented in the Ecotoxicology QAPP (Attachment A).

The following chemicals will be utilized as reference toxicants for the Pascagoula Harbor and Pascagoula Bar Channel dredged material testing for water column bioassays:

- *Mytilus edulis* - Copper chloride ($CuCl^2$)
- *Americamysis bahia* – Potassium chloride (KCl)
- *Menidia menidia* – Sodium dodecyl sulfate (SDS)

Control acceptability: *A. bahia* and *M. menidia* = $\geq$ 90 percent survival
M. edulis -= $\geq$ 70 percent survival and $\geq$ 70 percent shell development to hinged D-shaped prodisoconch I larva.

If the result of the reference toxicant test does not fall in the expected range or the test organisms, the sensitivity of the organisms and the overall credibility of the test system are suspect. In this case, the test procedure is examined for defects, and the reference toxicant test repeated. If no defect can be found in the test procedures, a repeated failure of reference toxicant test may indicate unacceptable organism sensitivity and new stock should be obtained.

13.4.2 Whole Sediment Bioassays

Bioassays with whole sediment are designed to determine whether the dredged material is likely to produce unacceptable adverse effects on benthic organisms by exposing the organisms to the whole sediment for 10 days. As per USEPA-Region IV's request, the estuarine amphipod *Leptocheirus plumulosus* and the polychaete *Neanthes arenaceodentata* will be used in the whole sediment bioassays.

In the whole sediment tests, survival will be the endpoint for the *L. plumulosus* and *N. arenaceodentata* tests. The age ranges as specified by the USEPA/USACE (2008) testing guidelines are: *N. arenaceodentata* (2-3 weeks) and *L. plumulosus* (mature 3-5 mm mixed sexes). In whole sediment bioassays, results will be statistically compared (single-point comparison) to results of the reference sediment as per *OTM* /*ITM/RIM* evaluation protocols.

Toxicity tests will consist of 10-day whole sediment bioassays conducted with *L. plumulosus* and *N. arenaceodentata*. Tests will consist of five replicates per species. Water for bioassays will consist of clean, uncontaminated seawater or an artificial sea salt mixture that does not exceed USEPA water quality criteria for marine species. Standard protocol will be followed with regard to feeding the organisms during the test (test organisms will not be fed during the 10-day test) (Attachment I).

Interstitial ammonia will be measured in the sediment pore water prior to initiation of the whole sediment bioassays to determine if the sediments will require ammonia purging prior to test initiation. If necessary, the ammonia will be lowered by replacing the overlying water in the test chambers twice per day, prior to introduction of the test organisms, until a target interstitial ammonia concentration of <20 mg/L is achieved.

Whole sediment bioassays will be performed on six samples from the Bayou Casotte Channel, three composite samples from the Pascagoula Lower Sound and two composite samples from Pascagoula Bar Channel. In addition, bioassays will be conducted on two reference samples. The control sediment for the amphipod bioassays will be collected from Cooper's Run in Pennsylvania. Whole sediment bioassays for the reference site sediments and the control sediment will be performed simultaneously with the testing of the sediment from Pascagoula Harbor/Bayou Casotte and Pascagoula Bar Channels.

Quality Control Procedures for Whole Sediment Bioassays

The following chemicals will be utilized as reference toxicants for the Pascagoula Harbor and Pascagoula Bar Channel dredged material testing for whole sediment bioassays:

- *Leptocheirus plumulosus* – Cadmium chloride ($CdCl^2$)
- *Neanthes arenaceodentata* - Cadmium chloride ($CdCl^2$)

Control acceptability: $\geq$ 90 percent survival

13.4.3 Bioaccumulation Testing

The bioaccumulation studies will consist of 28-day whole sediment assays using *Nereis virens* (sand worm) and *Macoma nasuta* (blunt-nose clam). Aquatic organisms to be used in the bioaccumulation tests were selected because they ingest sediments and survive equally well in dredged material and control and reference sediments. *N. virens* and *M. nasuta* were chosen for the 28-day bioaccumulation tests for the Bayou Casotte/Pascagoula Lower Sound and Pascagoula Bar Channel sediments based on the recommendation in the *OTM*, *ITM*, and *SERIM* (USEPA/USACE 1991, 1998, 2008) identifying these species as the primary benchmark species for near coastal waters that can also be used in estuarine waters down to appropriate low levels of salinity. Standard protocol will be followed with regard to feeding the organisms during the test (Attachment I).

The number of organisms used in the bioaccumulation tests will be dictated by the minimum amount of tissue that is required for analysis, and depends on the analytes, matrices, detection limits, and particular analytical laboratory.

Bioaccumulation studies will be performed on six samples from the Bayou Casotte Channel, three composite samples from the Pascagoula Lower Sound and two composite samples from Pascagoula Bar Channel, plus two samples from the reference sites. Target chemical analytes for tissue analysis will be selected following the receipt of the sediment chemistry results and discussions with USACE-Mobile District and USEPA-Region IV. Pre-test tissue (tissue from organisms not used in the bioaccumulation exposures) will be retained for chemical analysis to evaluate the concentration of target analytes of the organisms prior to exposure to test sediments.

Quality Control Procedures for Bioaccumulation Tests

The following chemicals will be utilized as reference toxicants for the Bayou Casotte, Pascagoula Lower Sound, and Pascagoula Bar Channel dredged material testing for bioaccumulation testing:

- *Nereis virens* – Sodium dodecyl sulfate (SDS)
- *Macoma nasuta* - Sodium dodecyl sulfate (SDS)

Control acceptability: $\geq$ 90 percent survival

14.0 ELEMENT B5 – QUALITY CONTROL REQUIREMENTS

Data quality objectives for sediment, water/elutriate, and tissue analyses, including frequency and acceptance criteria are presented in Section 7.

For the Bayou Casotte/Pascagoula Lower Sound Channels and Pascagoula Bar Channel projects, quality control samples specified in the ITM will be analyzed at the frequency stated below for each matrix. Standard Reference Materials (SRMs) will be obtained from National Institute of Standards and Technology (NIST) or a comparable source, if available.

Quality Control (QC) Sample	Frequency
Standard Reference Material	1 per 20 project samples
Method Blanks	1 per analytical batch of 1-20 samples
Laboratory Control Sample	1 per analytical batch of 1-20 samples
Surrogates	Spiked into all field and QC samples (organic analyses, where applicable)
Matrix Spike/Matrix Spike Duplicate or Analytical Duplicate	1 per 20 project samples (as assigned and where adequate sample volume is provided)

Standard Reference Materials (SRM) represent performance-based [Quality Assurance/Quality Control (QA/QC)]. A standard reference material is a sediment, tissue, or solution with a certified concentration that is analyzed as a sample and is used to monitor analytical accuracy. SRMs will be analyzed, if available, for the following matrix/fractions:

- Sediment: Chlorinated Pesticides, PCB congeners, Metals, PAHs.
- Water: Chlorinated Pesticides, PCB congeners, PAHs.
- Tissues: Chlorinated Pesticides, PCB congeners, Metals, PAHs.

The analytical results for the SRMs are evaluated against the certified concentrations. If the certified concentrations are <10 times the MDL established for the method, the SRM result will not be evaluated. The results of the SRMs are included with the associated analytical data.

The method (reagent) blank is used to monitor laboratory contamination. This is usually a sample of laboratory reagent water or standard solid material processed through the same analytical procedure as the sample (i.e., digested, extracted, distilled). One method blank is analyzed at a frequency of one per every analytical preparation batch of twenty (20) or fewer samples.

The Laboratory Control Sample (LCS) is a fortified method blank consisting of reagent water or solid fortified with the analytes of interest for single-analyte methods and selected analytes for multi-analyte methods according to the appropriate analytical method. They are prepared and analyzed with each analytical batch, and analyte recoveries are used to monitor analytical accuracy and precision.

A fortified sample (matrix spike) is an aliquot of a field sample which is fortified with the analytes of interest and analyzed to monitor matrix effects associated with a particular sample. Samples to be spiked are chosen at random or assigned by the client. The final spiked concentration of each analyte in the sample should be at least ten times the calculated MDL. Depending on the test, a duplicate fortified sample (matrix spike duplicate) will be performed for every twenty project samples.

A sample duplicate is a second aliquot of a field sample, which is analyzed to monitor analytical precision associated with that particular sample. Depending on the test, sample duplicates will be performed for every twenty project samples.

Surrogates are organic compounds that are similar to analytes of interest in chemical composition, extraction, and chromatography, but are not normally found in environmental samples. These compounds are spiked into all blank, standards, samples, and spiked samples prior to analysis for organic parameters. Generally, surrogates are not used for inorganic analyses. Percent recoveries are calculated for each surrogate. Surrogates are spiked into samples according to the requirements of the reference analytical. Surrogate spike recoveries are evaluated against the laboratory control limits, and are used to assess method performance and sample measurement bias. If sample dilution causes the surrogate concentration to fall below the quantitation limit, surrogate recoveries will not be evaluated.

The purpose of the SAP/QAPP is to provide a standard for control and review of measurement data to ensure they are scientifically sound, defensible, and of known acceptable quality. The data will be used to evaluate the physical and chemical attributes of sediments proposed for dredging. The project objective for analytical testing is to characterize sediments, elutriates, and site waters representative of the proposed dredging activities with regard to physical characteristics, chemical constituents, and ecotoxicological characteristics.

The PARCC (precision, accuracy, representativeness, completeness, and comparability) parameters are the characteristics of data quality.

Precision is the mutual agreement among individual measurements of the same property and is a measure of the random error component of the data collection process. The overall precision of the data is the sum of that due to sampling and analysis. To determine the analytical precision of the method and/or laboratory analyst, a routine program of replicate analyses is performed. The results of the replicate analyses are used to calculate the relative percent difference (RPD), which is the governing quality control parameter for precision.

Precision is represented as the RPD between measurement of an analyte in duplicate samples or in duplicate spikes. RPD is defined as follows:

$$RPD = \frac{|C_1 - C_2|}{(C_1 + C_2) / 2} \times 100$$

Where:
C_1 = first measurement value
C_2 = second measurement value

The %RSD is calculated by the standard deviation of the analytical results of the replicate determinations relative to the average of those results for a given analyte. This method of precision measurement can be expressed by the formula:

$$\% RSD = \frac{\text{Standard Deviation}}{\text{Mean}} \times 100 = \frac{[\Sigma (X_i - X_{mean})^2/(n-1)]^{1/2}}{(X_1 + X_2 + ...X_n)/n} \times 100$$

The % D is calculated by expressing as a percentage, the difference between the original value and new value relative to the original value. This method for precision measurement can be expressed by the formula:

$$\text{Percent Difference (\% D)} = \frac{|C_1 - C_2|}{C_1} \times 100$$

Where:

C_1 = concentration of analyte in the initial aliquot of the sample
C_2 = concentration of analyte in replicate

Accuracy is the agreement between a measurement and the true value. It is a measure of the bias or systematic error of the entire data collection process. Sampling accuracy is assessed by evaluating the results of field and trip blanks. To determine the accuracy of an analytical method, a periodic program of laboratory control sample spiking is conducted. The results of sample spiking are used to calculate the quality control parameter for accuracy evaluation, the percent recovery (%R).

Percent recovery is defined as follows:

$$\%R = \frac{(A_T - A_O)}{A_F} \times 100$$

Where:
A_T = Total amount recovered in fortified sample
A_O = Amount recovered in unfortified sample
A_F = Amount added to sample

Representativeness is the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a quantitative parameter that is most concerned with the proper design and implementation of the sampling program. The sampling program has been designed so that the samples collected are as representative as possible of the medium being sampled and that a sufficient number of samples will be collected. Representativeness is addressed by the description of the sampling techniques and the rationale used to select the sampling locations.

Completeness is the adequacy in quantity of valid measurements to prevent misinterpretation and to answer important questions. For this project, the data completeness objective is 90 percent.

$$\text{Completeness} = \frac{\text{Number of acceptable reported QC data}}{\text{Total number of reported QC data}} \times 100\%$$

Interbatch Comparability is the extent to which comparisons among different measurements of the same quantity or quality will yield valid conclusions. For this project, comparability among measurements will be achieved through the use of control limits for Laboratory Control Samples (LCS).

The objectives for precision and accuracy for each chemical are based on the capabilities of the approved USEPA analytical method with respect to laboratory performance. The quantitative objectives for accuracy and precision for the various parameter groups for laboratory performance and evaluation of sample measurement bias are presented.

A quality control program is a systematic process that controls the validity of analytical results by measuring the accuracy and precision of method and matrix, developing expected control limits, using these to detect anomalous events and requiring corrective action techniques to prevent or minimize the recurrence of these events. Quality control measurements for analytical protocols are designed to evaluate laboratory performance, and measurement biases resulting from the sample matrix and field performance.

- *Laboratory method performance:* All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks and laboratory control samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

- *Sample performance:* The accuracy and precision of sample analyses are influenced by both internal and external factors. Internal factors are those associated with sample preparation and analysis. Internal factors are monitored by the use of internal quality control samples. Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and/or matrix duplicates (MD). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

- *Field performance*: Quality control samples are used to evaluate the effectiveness of the sampling program to obtain representative samples, eliminating any cross contamination. These include trip blanks (for volatiles organics), field replicates, and field blanks.

15.0 ELEMENT B6 – INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE REQUIREMENTS

15.1 Field Instruments

YSI meters will be maintained in accordance with manufactures' recommendations, including but not limited to cleaning, inspection, changing batteries, and DO membrane replacement. YSIs will be inspected, tested, and calibrated prior to mobilizing to the field to ensure they are in good working order. Records of in-field calibrations will be recorded in the field log book.

Other field equipment used in the field – vibracore unit, Van Veen grab sampler, and ISCO water sampler will be maintained and periodically inspected during the field investigation to ensure that each piece of equipment is in proper working order.

15.2 Laboratory Instruments

Periodic preventive maintenance is required for all sensitive equipment. Instrument manuals will be kept on file for reference if equipment needs repair. The troubleshooting section of factory manuals may be used in assisting personnel in performing maintenance tasks. Major instruments in the laboratory are covered by annual service contracts with manufacturers. Under these agreements, regular preventive maintenance visits are made by trained service personnel. Maintenance is documented and maintained in permanent records by the individual responsible for each instrument.

The Section Supervisor or Department Manager is responsible for preparation, documentation and implementation of the maintenance program. The Quality Assurance Manager reviews implementation to verify compliance during scheduled internal audits. Specific preventive maintenance practices for laboratory equipment, and their frequency of performance are described in Table 15.1.

Table 15.1 Preventive Maintenance Requirements for Laboratory Equipment and Instrumentation

Instrument	Item Checked/Serviced	Frequency
Gas Chromatograph	EC (Ni-63) wipe test Change column Change gas wool plug Replace septum Change fuses Clean and silanize or replace glass liners or injectors Clean FID/NPD detectors Clean purge vessel Bake trap Replace trap Replace carrying gas filters	Semiannually As needed As needed As needed As needed As needed As needed or annually Daily Between each analysis As needed As needed
GC/MS	GC/MS maintenance is the same as GC with the following additions: Mechanical pump oil Turbo Pump oil Source-clean ceramics, polish lenses Clean poles and ceramics Replace Quartz injection port insert Column maintenance	Quarterly Annually As needed As needed As needed As needed

Table 15.1 Preventive Maintenance Requirements for Laboratory Equipment and Instrumentation

Instrument	Item Checked/Serviced	Frequency
HPLC	Pressure Plunger Scale High Pressure Pump Low Pressure Pump Check valves Lamps / detector Column maintenance	Daily Annually Annually Annually Annually or as needed As needed As needed
Atomic Absorption Spectrophotometer	Electrical Lamps Optics Clean Windows Replace graphite tube Replace contact rings Replace quartz windows Clean furnace windows Align background lamp (3F) Check lamp intensity	Each shift Each parameter Annually Daily, with each parameter At beginning of each run Quarterly, or as needed As needed At beginning of new run When serviced by repairman Each parameter
Inductively Coupled Plasma Spectrophotometer	Sample Introduction system Check pumps Check electronics Clean, realign torch Change nebulizer Clean mixing chamber Check nebulizer press Replace pump tubing Clean air filters (7P) and water filter	Daily Daily Daily As needed As needed As needed As needed Daily, or as needed Semiannually
Ion Chromatograph	Plunger seals Plumbing Oil pumps Check valves Column Change Fuses Prime Pump head Check pressure	As needed As needed As needed As needed As needed As needed As needed Daily
Infrared Spectrophotometer	Clean Cells	Daily
Total Organic Carbon Instrument	Check oxygen purity Check heater Add acid	Each new cylinder Daily when used Monthly
UV/Vis Spectrophotometer	Clean cells and windows Lamp Wavelength checked Serviced	Daily As needed Annually As needed
Auto-Analyzer	Pump oiled Tubing Lamps	Monthly As needed As needed
PH meter	Electronics checked Electrolyte changed	Daily Checked weekly; changed when low
Refrigerators/Freezers	Temperature checked and logged Compartment cleaned	Daily on each work day Quarterly
Walk-in Coolers	Temperature checked and logged Compartment cleaned	Daily on each work day Quarterly

Table 15.1 Preventive Maintenance Requirements for Laboratory Equipment and Instrumentation

Instrument	Item Checked/Serviced	Frequency
Balances	Service representative calibration Internal weight train, gears, electronics Calibration Checked	Annually Annual Service Daily with class "P" weights Analytical: Weekly with class "S" weights Toploading: Monthly with class "S" weights
Thermometers	Calibrated	Annually for mercury in glass thermometers Quarterly for all other thermometers
Class S Weights	Calibrated	Annually
Deionized / Organopure Water	Conductivity check Ion-exchange bed changed Replace filters	Daily Weekly As needed
Vacuum Pumps and Air Compressor	Check performance Lubrication, belts, etc.	Weekly As needed
Water Baths	Water level Bath Cleaned	Added as needed Semiannually

16.0 ELEMENT B7 – INSTRUMENT CALIBRATION AND FREQUENCY

16.1 Field Instruments

The YSI will be calibrated at the beginning and end of each day to document that the instrument remained calibrated throughout the course of the sampling day. Calibration records will be included in the Daily Quality Control Reports.

16.2 Laboratory Instrumentation

All laboratory instruments used for the Pascagoula Harbor Navigation Channel Improvements and Pascagoula Bar Channel projects will be calibrated according to the method, laboratory Quality Assurance Manual, SOP, or other NELAC approved method. Instruments and equipment used in TestAmerica Laboratories are controlled by a formal calibration program. The program verifies that equipment is of the proper type, range, accuracy, and precision to provide data compatible with specified requirements. All instruments and equipment that measure a quantity, or whose performance is expected at a stated level, are subject to calibration. Calibration is performed by TestAmerica Laboratories' personnel using reference standards or externally by calibration agencies or equipment manufacturers.

This section prescribes the practices use by TestAmerica Laboratories to implement a calibration program. Development and documentation of the laboratory calibration program is the responsibility of the laboratory managers. Implementation is the responsibility of the supervisors and chemists. The Quality Assurance Manager (QAM) monitors the procedures. Specifics are not provided because the requirements for the calibration of instruments and equipment are dependent upon the type and expected performance of individual instruments and equipment. Therefore, TestAmerica Laboratories uses the guidelines provided herein to develop a calibration program.

Two types of calibration are discussed in this section:

- *Operation calibration*, which is routinely performed as part of analytical procedure or test method, such as the development of a standard curve for use with an atomic absorption spectrophotometer. Operation calibration is generally performed for instrument systems.

- *Periodic calibration*, which is performed at prescribed intervals for equipment, such as balances and thermometers. In general, equipment which can be calibrated periodically is a distinct, singular purpose unit and is relatively stable in performance.

Written procedures are used by TestAmerica Laboratories for all instruments and equipment subject to calibration. Whenever possible, recognized procedures, such as those published by ASTM International (ASTM) or the USEPA are adopted. If established procedures are not available, a procedure is developed that accounts for the type of equipment, the stability characteristics of the equipment, the required accuracy, and the effect of operational error on the quantities measured. As a minimum, the procedures include:

  - Equipment to be calibrated
  - Reference standards used for calibration
  - Calibration technique and sequential actions
  - Acceptable performance tolerances
  - Frequency of calibration
  - Calibration documentation format

Instruments and equipment are calibrated at prescribed intervals and/or as part of the operational use of the equipment. The calibration frequency is based on the type of equipment, inherent stability, manufacturer's recommendations, values provided in recognized standards, intended data use, specified analytical methods, effect of error upon the measurement process, and prior experience.

Two types of reference standards are used within TestAmerica Laboratories for calibration:

- *Physical standards*, such as weights for calibrating balances and certified thermometers for calibrating working thermometers, refrigerators and ovens, are generally used for periodic calibration. Whenever possible, physical reference standards have known relationships to nationally recognized standards (e.g., NIST) or accepted values of natural physical constants. If national standards do not exist, the basis for the reference is documented. Physical reference standards are used only for calibration and are stored separately from equipment used in analyses. In general, physical standards are recalibrated annually by a certified external agency, and documentation is maintained by the Quality Assurance (QA) staff.

- *Chemical standards*, such as vendor certified stock solutions and neat compounds, are generally used for operational calibration. TestAmerica Laboratories document all standard preparation activities in order to provide traceability for all standards used for calibration and QC samples.

Equipment that cannot be calibrated or becomes inoperable is removed from service. Such equipment must be repaired and satisfactorily recalibrated before reuse. For equipment that fails calibration, analysis cannot proceed until appropriate corrective action is taken and the analyst achieves an acceptable calibration. This is documented in a Nonconformance Memo (NCM).

Scheduled calibration of equipment does not relieve the laboratory staff of the responsibility for using properly functioning equipment. If an equipment malfunction is suspected, the equipment is tagged and removed from service and recalibrated. If it fails recalibration, the above process shall apply. The Section supervisors or Department Managers are responsible for the development and implementation of a contingency plan for major equipment failure. The plan includes guidelines on waiting for repairs, use of other instrumentation, subcontracting analyses, and evaluating scheduled priorities.

Records are prepared and maintained for each piece of equipment subject to calibration. Records demonstrating accuracy of preparation, stability, and proof of continuity of reference standards are also maintained. Records for periodically calibrated equipment are maintained in the instrument log books, or in the equipment file maintained by the Section Supervisor or Department Manager. Records for periodically calibrated equipment shall include, as appropriate:

- A unique identification number equipment and type of equipment
- Calibration frequency and acceptable tolerances
- Identification of calibration procedure used
- The date calibration was performed
- The identity of TestAmerica Laboratories' personnel and/or external agencies performing calibration
- Identification of the reference standards used for calibration
- The calibration date
- Certificates or statements of analysis provided by manufacturers and external agencies and traceability to national standards
- Information regarding calibration acceptance or failure and any repair of failed equipment

For instruments and equipment that are calibrated on an operational basis, calibration generally consists of determining instrumental response against compounds of known composition and concentration or the preparation of a standard response curve of the same compound at different concentrations (Table 16.1). Records of these calibrations are maintained in the following documents:

- Standard preparation information, to trace the standards to the original source solution of neat compound, is maintained in the LIMS reagent system or laboratory standard preparation logs.

- The instrument logbook provides an ongoing record of the calibration undertaken for a specific instrument. The logbook should be indexed in the laboratory operations records but should be maintained at the instrument by the chemist. All entries should be signed and dated by the chemist and reviewed periodically by the Section Supervisor or Department Manager or their designees.

- Copies of the raw calibration data are kept with the analytical sample data. In this way results can be readily processed and verified because the raw data package is complete as a unit. If samples from several projects are processed together, the calibration data is copied and included with each group of data.

The analyst analyzes a method blank to determine if the cumulative blank interferes with the analysis. A method blank is prepared whenever samples are processed through steps that are not applied to the calibration standards. The method blank is prepared by following the procedure step by step, including the addition of all the reagents and solvents in the quantity added to the sample. If this cumulative blank interferes with the determination, steps are taken to eliminate or reduce the interference to a level that will permit the combination of solvents and reagents to be used. If the blank interference cannot be eliminated, the magnitude of the interference must be considered when calculating the concentration of specific constituents in the samples analyzed.

Periodic calibrations are performed for equipment (e.g. balances, thermometers that is required in the analytical method, but that is not routinely calibrated as part of the analytical procedure (Table 16.2).

Table 16.1 Summary of Operational Calibration Formulas

Application	Formula	Symbols
Linear Calibration Curves	$C = (R - a_0) / a_1$	C = analytical concentration R = instrument response a_0 = intercept of regression curve (instrument response when concentration is zero) a_1 = slope of regression curve (change in response per change in concentration)
Calibration Factors[1]	$CF = \frac{A_x}{C}$	C = concentration (ug/L) CF = calibration factor A_x = peak size of target compound in sample extract
Response Factors[2]	$RF = \frac{C_{is} A_x}{C A_{is}}$	C = Concentration (ug/L) RF = internal standard response factor C_{is} = concentration of the internal standard (ug/L) A_x = peak size of target compound in sample extract A_{is} = area of the characteristic ion for the internal standard

1. Used for quantitation by the external standard technique.
2. Used for quantitation by the internal standard technique.

Table 16.2 Summary of Periodic Calibration Requirements

Instrument	Calibration Frequency		Corrective Actions
Analytical Balances	Daily: Annually:	Sensitivity (with a Class S-verified weight) Calibrated by outside vendor against certified Class S weights	Adjust sensitivity Service balance
Thermometers	Annually:	Calibrated against certified NIST thermometers	Tag and remove from service
Automatic Pipettors	Quarterly:	Gravimetric check	Service or replacement

17.0 ELEMENT B8 – INSPECTIONS/ACCEPTANCE REQUIREMENTS FOR SUPPLIES AND CONSUMABLES

For this program, TestAmerica-Pittsburgh will purchase and distribute pre-cleaned sample containers with chemical preservatives. TestAmerica's vendors are required to provide documentation of analysis for each lot of containers, and the documentation is kept on file in the Sample Management Office at TestAmerica.

De-ionized water, which is used for equipment blanks, is provided by the EA's Ecotoxicology Laboratory in Sparks, Maryland.

The organisms used in the Ecotoxicology Laboratory for the water column bioassays, whole sediment bioassays, and bioaccumulation tests will be acquired from the following vendors:

- *Mytilus edulis* – Carlsbad Aquafarm, Carlsbad, California
- *Americamysis bahia* – Aquatic BioSystems, Ft. Collins, Colorado
- *Menidia beryllina* – Aquatic BioSystems, or Aquatic Indicators, St. Augustine, Florida
- *Leptocheirus plumulosus* – Chesapeake Cultures, Hayes, Virginia
- *Neanthes arenaceodentata* – University of California, Long Beach, California
- *Macoma nasuta* and *Nereis virens* – Aquatic Research Organisms, Hampton, New Hampshire

18.0 ELEMENT B9 – DATA ACQUISITION REQUIREMENTS (NON-DIRECT MEASUREMENTS)

Various forms of data will be generated while implementing this project: photographs, maps, GIS data, analytical data, laboratory records, etc. All data generated during this project will be retained by the contractor for up to five years. Any data not required to be submitted as described in Section 6 will be supplied to USACE and/or USEPA upon request.

19.0 ELEMENT B10 – DATA MANAGEMENT, INTERPRETATION, AND REDUCTION

19.1 Data Management

A log of sampling activities, sampling locations, water depths, sample IDs, and water quality data will be recorded in permanently bound logbooks in indelible ink. Personnel names, local weather conditions, and other information that impacted the field sampling program will also be recorded. Each page of the logbook will be numbered and dated by the personnel entering information. A full copy of the project logbooks will be provided with the comprehensive reports for the Pascagoula Harbor Navigation Channel Improvements and Pascagoula Bar Channel projects.

19.2 Data Management and Reduction at TestAmerica

Data Collection: For inorganic and general organic analyses where the instruments are not directly coupled to computerized data systems, the raw data are instrument responses in the form of meter, recorder, or printer output. The chemist performing the analysis enters the bench-generated data into a bound laboratory workbook specific for each parameter. All entries are made in ink. These data consist of instrumental responses (absorbances, percent transmittances, etc.), standard and spike concentrations, sample numbers, and any other pertinent information. The workbooks are under the control of the group supervisor who is responsible for their security. For computerized instruments the output is in the form of printer output and files on magnetic disks, which are filed by sample batch.

For chromatographic organic analyses the raw data are instrument responses in the form of chromatograms, integrator outputs, or computer-generated data files. The chromatograms and printer output are stored in project-specific files. The data files are archived on magnetic tape or disks.

Data Reduction: Data reduction includes all processes that change either the values or numbers of data items. The data reduction processes used in the laboratory include establishment of calibration curves, calculation of sample concentrations from instrument responses, and computation of quality control.

Sample Calculation: The reduction of instrument responses to sample concentrations takes different forms for different types of methods. The discussion below deals with nonchromatographic and chromatographic methods and solid sample calculations.

For most spectrophotometric analyses, the sample concentrations are calculated from the measured instrument responses using a calibration curve. The sample concentrations can be back-calculated from a regression equation fitted to calibration data. For gravimetric and titrimetric analyses, the calculations are performed according to equations given in the method. For chromatographic analyses, the unknown concentrations are determined using either calibration factors (external standard procedure) or relative response factors (internal standard procedure). Gas Chromatography (GC) analyses are generally quantitated using the external standard technique while Gas Chromatography/Mass Spectrometry (GC/MS) analyses are quantitated using the internal standard technique. These calculations are generally performed by the associated computerized data systems.

The final concentrations will be reported on a dry-weight basis for sediments. In order to meet program detection limit requirements for several parameters, the percent solids of a sediment sample will be determined prior to analysis, and the method initial weight will be adjusted (up to 50 percent moisture) to achieve the method initial weight on a "dry-weight" basis. For sediments where the percent moisture is greater than 50 percent, an initial sample aliquot equivalent to twice the method initial weight will be used where appropriate.

Reporting Conventions and Units: The number of conventions set forth in the figures for reported data will be consistent with standard laboratory procedures. Reporting units used are those commonly used for the analyses performed. Concentrations in sediment samples are expressed in terms of weight per unit dry weight [e.g., mg/kg (dry), ug/kg (dry)].

The laboratory Reports Group receives the data package after the Section Supervisor or Department Manager has released it. The Reports Group assembles the draft report by collecting and incorporating:

- All the data packages for each analysis associated with the reported samples,
- The analytical narratives, and
- Other report-related information, such as copies of chain-of-custody, communication records, and nonconformance forms.

It is prepared and reviewed by the Reports staff. The draft data report is then reviewed by the appropriate laboratory Project Manager who signs the report narrative to certify that the report meets the Data Quality Objectives for precision, accuracy, and completeness specified for the project. The report is released to the client, and a copy is archived by the laboratory for a period of five years.

19.3 Data Reduction at EA's Ecotoxicology Laboratory

For acute toxicity tests, the LC50 values and associated statistics may be derived by the binomial, moving average, or probit methods (Finney 1971; Stephan 1977), as programmed for computer calculation (USEPA 2002b). Depending on the nature of specific data sets, other methods may be employed including the trimmed Spearman-Karber (Hamilton 1977), SAS probit analysis (SAS Institute 1985), or graphic interpolation (APHA et al. 1998). The actual method used is specified in the report. When applicable, EC50 values and associated statistics are derived using the USEPA program ECVALUES (or equivalent).

For chronic toxicity tests, statistical analyses are conducted according to USEPA guidance on one or more of the following chronic endpoints: survival, young production, fecundity, and/or growth. The endpoints chosen for statistical analyses are dependent on the type of chronic test conducted. The use of a parametric versus nonparametric test is based on the assumptions of normality and homogeneity of variance. The test for normality is the Shapiro-Wilk's Test (for datasets with ≤50 datapoints) or the Chi-Square test. To test for homogeneity of variance, the Bartlett's Test or the F-Test (for single concentration comparisons) is used. An analysis of variance (ANOVA) and either Dunnett's Mean Comparison test or Bonferroni's T-test are the parametric tests used to analyze the chosen endpoint for significance of effects. Steel's Many-One Rank Test or the Wilcoxon Rank Sum Test are the alternative nonparametric tests.

Upon acquiring a statistical computer program to analyze toxicological data, the results generated by the acquired program are verified against another program using the same data set. Copies of the verified test data remain on file in the Ecotoxicology Laboratory central files. All computer input is verified for accuracy.

All final reports generated by the Ecotoxicology Laboratory are subjected to QA review before they are sent to clients. Reports are reviewed for completeness, accuracy, and conformance with study plans, EA testing protocols, and approved guidelines and procedures. A QA Report Review form is completed specific to the requirements of each test as part of the review process. A Report Quality Assurance Record accompanies the report to document that quality assurance/control requirements have been met and the report is approved. Data generated in the laboratory, including bench sheets, reports, tables, and raw data, are stored in the respective client files for a minimum of five years.

19.4 Data Calculations and Interpretation

19.4.1 Calculation of Total PCBs, Total PAHs, and Total Butyltins

For each sample, individual PCB congener concentrations will be reported in addition to two total PCB concentrations, USEPA-Region 4 PCBs and National Oceanic and Atmospheric Administration (NOAA) PCBs. USEPA-Region 4 PCBs total will be determined by summing the 26 individual PCBs in Table 5-6 of the SERIM. The total NOAA PCBs will determined by summing the concentrations of the 18 summation congeners (as specified in Table 5-6 of the SERIM) and multiplying the total by a factor of two. Multiplying by a factor of two estimates the total PCB concentration and accounts for additional congeners that are not part of the calculation.

In addition to individual PAH concentrations, two total PAH concentrations will be reported, low molecular weight (LMW) PAHs and high molecular weight (HMW) PAHs, as described in Table 5-5 of the SERIM. There are six LMW PAHs and six HMW PAHs.

Butyltins will be reported as individual concentrations as well as total butyltins. Total butyltins will be calculated according to the following equation:

$$Total\ butyltin\ as\ tin = \sum \left(\frac{TBT}{2.44} + \frac{DBT}{1.96} + \frac{MBT}{1.48} \right)$$

When calculating the total PCB, total PAH, and total butyltin concentrations, analyte concentrations below the RL will be treated in the following manner:

- if the RL for the analyte is below the TDL then one-half the reporting limit will be the concentration used in the calculation
- if the RL for the analyte is above the TDL then the reporting limit will be the concentration used in the calculation

19.4.2 Calculation of Dioxin TEQs

Two Toxicity Equivalency Quotients (TEQs) for dioxin will be calculated for each sample, a dioxin TEQ and a dioxin and dioxin-like compounds TEQ. The dioxin TEQ will follow the approach in Van den Berg et al. 2006 (Johnson, personal communication) and will include OCDD and OCDF in the calculation, as well as the other 15 tested dioxins (Table 19.1). The dioxin and dioxin-like compounds TEQ will follow the approach in SERIM. It will include 15 tested dioxins (excluding OCDD and OCDF) and three persistent PCBs (77, 126 and 169) (Table 19.1). Each congener will be multiplied by a Toxicity Equivalency Factor (TEF) for human health (Van den Berg et al. 2006) and then the congener concentrations will be summed.

Table19.1 Dioxin TEFs and Compounds Included in TEQ calculations

Congener	Human/Mammals TEF	Dioxin TEQ	Dioxin and Dioxin-Like compounds TEQ
Chlorinated dibenzo-p-dioxins (CDDs)			
2,3,7,8-TCDD	1	X	X
1,2,3,7,8-PECDD	1	X	X
1,2,3,4,7,8-HXCDD	0.1	X	X
1,2,3,6,7,8-HXCDD	0.1	X	X
1,2,3,7,8,9-HXCDD	0.1	X	X
1,2,3,4,6,7,8-HPCDD	0.01	X	X
OCDD	0.0003	X	
Chlorinated dibenzofurans (CDFs)			
2,3,7,8-TCDF	0.1	X	X
1,2,3,7,8-PECDF	0.03	X	X
2,3,4,7,8-PECDF	0.3	X	X
1,2,3,4,7,8-HXCDF	0.1	X	X
1,2,3,6,7,8-HXCDF	0.1	X	X
2,3,4,6,7,8-HXCDF	0.1	X	X
1,2,3,7,8,9-HXCDF	0.1	X	X
1,2,3,4,6,7,8-HPCDF	0.01	X	X
1,2,3,4,7,8,9-HPCDF	0.01	X	X
OCDF	0.0003	X	
Polychlorinated biphenyls			
3,3’,4,4’ tetraCB (77)	0.0001		X
3,3’,4,4’,5 pentaCB (126)	0.1		X
3,3’,4,4’,5,5’, hexaCB (169)	0.03		X

Concentrations that are flagged with a "B" (detected in blank) or "Q" (estimated maximum possible concentration) will not be included in the TEQ calculation as per the USEPA dioxin validation guidance (USEPA 2005). The dioxin TEQs will be calculated as follows:

- Non-detects = 1/2 of the reporting limit (ND=½RL)
- Non-detects = the reporting limit (ND=RL).

19.4.3 Calculations for Tissues

Tissues will be analyzed as part of the project. The tissues will include clam and worms resulting from bioaccumulation testing conducted by EA Engineering, Science & Technology. The final testing regime will be determined based on the bulk sediment results, but is expected to include, at a minimum, metals and lipids. The following calculations will be performed for tissue analytes if the analytes are included in the testing protocol.

Individual PCB congeners, total NOAA PCBs, and total USEPA-Region 4 PCBs will be reported for tissue data. NOAA PCBs will only be compared to data collected in the NOAA Mussel Watch and Status and Trends Program. Total USEPA-Region 4 PCBs will be used for statistical comparisons described in Section 6.0. In addition, individual PAHs, LMW PAH totals, and HMW PAH totals will also be calculated for tissue samples. Butyltins will be calculated as individual butyltins and total butyltins (as described in the above section).

When calculating the total PCB, total PAH, and total butyltin concentrations in tissues, analyte concentrations below the RL will be treated in the following manner:

- if the RL for the analyte is below the TDL then one-half the RL or the estimated (J-flagged) value, whichever is greater, will be the concentration used in the calculation

- if the RL for the analyte is above the TDL then the RL will be the concentration used in the calculation

For the statistical comparisons replicate data with a value below the RL in at least one of the five replicates will be treated in the following manner:

- If one or two of the treatment replicates has a concentration below the RL, then the RL will be used,

- If three of the treatment replicates have concentrations below the RL, then one-half the RL or the estimated (J-flagged) value, whichever is greater, will be used,

- If four or five of the treatment replicates has a concentration below the RL then no statistical comparison should be made, and

- If the RL is above the TDL for any of the analytes, the RL will be used, regardless of what is stated above.

However, for reference replicate treatments below the RL, one-half the RL or the estimated (J-flagged) value, whichever is less, will always be used. If the TDL is above the RL for the analyte, one-half the RL will still be used in calculations.

19.4.4 Data Interpretation

The data interpretation procedures are discussed in Section 6.0.

The Pascagoula Harbor Navigation Channel Improvements and Pascagoula Bar Channel data reports and the Section 103s for each project will undergo extensive internal review and will be submitted to USACE-Mobile. Accompanying the final data report and Section 103 documents will be a CD containing the final report, appendices, and STFATE modeling output files.

GROUP C. ASSESSMENT AND OVERSIGHT

20.0 ELEMENT C1 – ASSESSMENTS AND RESPONSE ACTIONS

20.1 Analytical Laboratory Assessment and Oversight

The QA/QC program is to be regularly and formally assessed in terms of the adequacy of and compliance with the program; the effectiveness of established controls, procedures, and systems; and the adequacy of resources to achieve and ensure quality on project activities. Audit activities are to correspond to the type of work being evaluated and its significance within the context of the project. Results of auditing activities are to be documented and included in the permanent project file. To the extent practical, on-site audits and reviews are to be conducted during early stages of activities to evaluate the planning, design, execution, and documentation of quality-affecting activities and to help identify and correct problems in a timely manner. Specific audit actions are described in the following subsections.

The laboratory QAM conducts routine internal audits of each laboratory section for completeness, accuracy, and adherence to standard operating procedures. The audit team is to verify that the laboratory's measurement systems are operated within specified acceptable control criteria, and that a system is in place to ensure that out-of-control conditions are efficiently identified and corrected.

Raw instrument data for GC, High Performance Liquid Chromatography (HPLC), and GC/MS analyses are maintained on magnetic tape media or optical media by the laboratory's LAN (local area network) Administrator in a secured fireproof safe. During routine audits, the audit team will verify the processing of the raw data file by reviewing randomly selected electronic data files and comparing the results with the hardcopy report. Tapes are archived for a period of three years. Tapes are also available for audit by regulatory agencies upon request.

The Corrective Action Process is the mechanism for identifying and solving nonconformance problems. The objective of the Corrective Action Process is to ensure that recognized nonconformances in the performance of any activity associated with environmental data collection and management lead to effective remedial measures, and the steps taken to correct an existing condition are documented to provide assurance that any deficiencies are recognized in later interpretation and are not recurrent.

The steps comprising the Corrective Action Process are:

- Define the problem
- Investigate
- Determine the cause
- Develop a corrective action plan
- Implement and document the corrective action
- Follow-up to verify that the corrective action has eliminated the problem
- Document the process

Problem solving can be straightforward; however, in many cases the investigation and solution takes time. In cases where an investigation is underway, documentation of the nonconformance and the Corrective Action must include a discussion of the status of the investigation. In addition, there may be instances where a nonconformance is investigated and there is no assignable cause after all quality control checks have been evaluated. In this case, the Corrective Action documentation should state and indicate that the process will be monitored to determine if the nonconformance was isolated or reoccurs.

A nonconforming item or situation is one that has the potential to affect the quality or quantity of data generated by the laboratory or the interpretation or use of the data by the client. These include:

- Deviations or variances from the prescribed requirements in the QAPP, SOP, or Method SOP.
- Out-of-control laboratory performance quality control samples
- Malfunctions of equipment or instruments; or any unusual occurrences or circumstances.

Nonconformances may be identified at any point along the flow of samples and data through the laboratory.

Nonconformances are designated as a deficiency or an anomaly, and are differentiated with respect to the impact on the quality of the sample data for its intended use.

Deficiency: An unplanned deviation from an established protocol or plan, which was the result of TestAmerica's actions.

Anomaly: An unplanned deviation from an established protocol or plan, which was the result of events beyond the control of TestAmerica.

All non-conformances that may affect the use of the analytical data are communicated to the client by the Laboratory PM verbally and summarized in the report narrative.

Nonconformances are recorded and reported using TestAmerica's Nonconformance Documentation tracking systems. Each Nonconformance Memo (NCM) has a unique control number that is used to cross-reference the nonconformance and its resolution to the associated project records.

The NCM may be either hard copy record or electronic database record. In either case, review and release of the record must be documented by the initiator, the analytical group leader where appropriate, the Project Manager and the Quality Assurance manager. The issue resolution should be summarized in the report narrative and archived in the project records.

The NCM form is divided into five sections: Problem Description / Root Cause, Corrective Action, Client Notification Summary, Quality Assurance Verification, and Approval History Action. Critical nonconformances, such are re-issued reports and client complaints, are summarized by the Quality assurance manager in a monthly report to the laboratory staff.

Project specific communication and any NCM's will be communicated to Ms. Olsen (EA Engineering) via email by the laboratory project manager (Ms. Gamber - TestAmerica Pittsburgh). Mr. Blakely (TestAmerica North Canton), Mr. Lavigne (TestAmerica Burlington), and Ms. McKinney (TestAmerica Knoxville) will direct any project communication directly to Ms. Olsen (EA Engineering) via email and copy Ms. Gamber. The email communication will be followed up with a phone call to Ms. Olsen to verify receipt and discuss any necessary resolution.

20.2 Field Nonconformances

Any event that does not conform to the SAP/QAP, SOPs, or QAMS is considered a nonconformance event. These will be identified as quickly as possible and reported to the Project Manager as soon as practical. If the nonconformance event happens in the fieldwork portion of this project, it will be documented in the Daily Quality Control Report (DQCR). The project manager will confer with the USACE-Mobile District and outline a procedure for accomplishing the task so the quality of the project is not compromised. Every effort will be taken to contact the USACE and/or USEPA representative prior to any deviation from the procedures documented in this SAP/QAPP.

20.3 Performance and Systems Audits

An individual audit plan will be developed to provide a basis for each audit. This plan will identify the audit scope, activities to be audited, audit personnel, any applicable documents, and the schedule. Checklists will be prepared by the auditors and used to conduct all audits. They will be developed to accomplish the necessary reviews and to document the results of the audit.

Audits may involve on-site visits by the auditor. Items to be examined may include the availability and implementation of approved work procedures; implementation and documentation of health and safety procedures; calibration and operation of equipment; packaging, storage, and shipping of samples obtained; performance documentation; and nonconformance (variance) documentation.

The records of operations will be reviewed to verify that laboratory activities were performed in accordance with the appropriate approved procedures. Items reviewed will include, but will not be limited to, the calibration records of equipment, chain-of-custody documentation, and data resulting from laboratory operations.

20.3.1 Laboratory Performance and System Audits

Audits are performed routinely to review and evaluate the adequacy and effectiveness of laboratory performance and quality assurance program to ascertain if the SAP/QAPP is being completely and uniformly implemented, to assess the effectiveness of the laboratory quality assurance program, to identify nonconformances, and verify that identified deficiencies are corrected. The laboratory Quality Assurance Manager (QAM) is responsible for such audits and will perform them according to a schedule planned to coincide with appropriate activities on the project schedule and sampling plans. Such scheduled audits may be supplemented by additional audits for one or more of the following reasons:

- When significant changes are made in the SAP/QAPP.
- When it is necessary to verify that corrective action has been taken on a nonconformance reported in a previous audit.
- When requested by the Project Manager or Laboratory QAM.

20.3.2 Performance Audits

Performance Audits are independent sample checks made by a supervisor or auditor to arrive at a quantitative measure of the quality of the data produced by one section or the entire measurement process. Performance audits are conducted by introducing control samples, in addition to those used routinely, into the data production process. These control samples will include performance evaluation samples of known concentrations. Where a SRM of similar matrix is available, it will be used.

The results of performance audits are evaluated against acceptance criteria. The results are summarized and maintained by the QAM and distributed to the supervisors who must investigate and respond to the results that are outside the control limits.

20.3.3 System Audits

Systems Audits are on-site qualitative inspections and reviews of the quality assurance system used by some part of or the entire measurement system. System audits are conducted by the QA group with the assistance and involvement of laboratory personnel. The audits are performed against the requirements, specified in the SAP/QAPP. A checklist is generally generated from the requirements and becomes the basis for the audit. The results of any deficiencies noted during the audit are summarized in an audit report.

20.3.4 Audit Procedures

Prior to an audit, the designated lead auditor prepares an audit checklist. During an audit and upon its completion, the auditor(s) will discuss the findings with the individuals audited and discuss and agree on corrective actions to be initiated. The auditor will prepare and submit an audit report to the Section Supervisor or department manager of the audited group, the Project Manager, and the Quality Assurance Manager. Minor administrative findings, that can be resolved to the satisfaction of the auditor during an audit, are not required to be cited as items requiring corrective action. Findings that are not resolved during the course of the audit and findings affecting the overall quality of the project will be included in the audit report.

The Section supervisor or Department Manager of the audited group will prepare and submit to the QAM a reply to the audit. This reply will include, at a minimum, a plan for implementing the corrective action to be taken on nonconformances indicated in the Audit Report, the date by which such corrective action will be completed, and actions taken to prevent reoccurrence. If the corrective action has been completed, supporting documentation should be attached to the reply. The Auditor will ascertain (by reaudit or other mans) if appropriate and timely corrective action has been implemented.

Records of audits will be maintained in the project files. Audit files will include, as a minimum, the Audit Report, the reply to the audit, and any supporting documents. It is the responsibility of the Section Supervisor or Department Manager to conform to the established procedures, particularly as to development and implementation of such corrective action(s).

20.3.5 Documentation

To ensure that the previously defined scope of the individual audits is accomplished and that the audits follow established procedures, a checklist will be completed during each audit. The checklist will detail the activities to be executed and ensure that the auditing plan is accurate. Audit checklists will be prepared in advance and will be available for review. At a minimum, the checklist will allow space for the following information:

- Data and type of audit
- Name and title of auditor
- Description of group, task or facility being audited
- Names of lead technical personnel present at audit
- Checklist of audit items according to scope of audit
- Deficiencies or nonconformances

Following each system, performance, and data audit, the QAM will prepare a report to document the findings of the specific audit. The report is submitted to the General Manager, TestAmerica Laboratory Director, Corporate Quality Assurance; and the Section Supervisor or Department Manager of the audited group to ensure that objectives of the QA program are met. In general, the format of the audit quality assurance reports will consist, at a minimum, of the following:

- Description and date of audit
- Name of auditor
- Copies of completed, signed, and dated audit form and/or checklist
- Summary of findings of the audit including any nonconformance or deficiencies
- Date of report and appropriate signatures
- Description of corrective actions

A copy of the signed and dated report for each audit will be maintained by the QAM, and will also be placed in project files as necessary.

21.0 ELEMENT C2 – REPORTS TO MANAGEMENT

The reports that will be submitted for this project are summarized in Section 6.0.

GROUP D. DATA VALIDATION AND USABILITY

22.0 ELEMENT D1 – DATA REVIEW, VALIDATION, AND VERIFICATION REQUIREMENTS

Data validation is a process used to accept or reject data and determine if the data are traceable, defensible, and can be used for a particular project. Each laboratory has established, state-approved procedures for data collection, validation, reduction, and reporting. As such, the analytical results will be extensively reviewed in-house by the laboratories submitting the data.

23.0 ELEMENT D2 – VALIDATION AND VERIFICATION METHODS

23.1 Data Validation at TestAmerica

Laboratory quality control criteria for method performance and sample measurement bias are listed in Section 7.0, and include the following:

- Holding times
- Initial and continuing calibration
- Laboratory blanks
- Surrogate recoveries
- Matrix spikes and matrix spike duplicates

In addition to the quality control parameters, data are assessed against the stated requirements on the chain-of-custody and sample handling procedures (Section 12.0). The reviewers also check that transcriptions of raw or final data are correct and that calculations are performed correctly and verified.

The data review process includes a full first level "technical" review by the analyst during sample analysis and data generation. This is followed by a second level "technical" review of the data. The second level review may be performed by a "peer" trained in the procedures being reviewed, or by the appropriate analytical group supervisor. Data review checklists are used to document the performance and review of the quality control and analytical data. Prior to final release to the client, the data gets a final review by the project manager or their designee. This third level review is to ensure that the report is complete and meets project requirements for performance and documentation. All reports involving non-conforming data issues must be reviewed by the Project Manager and the QA Manager. A summary of all non-conformances will be included in the case narrative.

23.2 Data Validation at EA's Ecotoxicology Laboratory

Throughout the course of testing, there are many quality control checks that are performed to ensure the integrity of the data. Specifically, the sample custodian is responsible for completing and checking the sample custody record. The laboratory technician is responsible for completing calibration documentation, sample preparation logs, and instrument logs. The QA Officer verifies through review of the data packet and regular laboratory inspections that the above activities are completed and documented.

Manual calculations are performed by knowledgeable personnel and recorded on computational sheets which contain sufficient information to identify the project, the date, and the persons who originated and verified the calculations. Manual calculations, whether simple or complex, are checked by a minimum of one reviewer other than the person who performed the original calculations.

24.0 ELEMENT D3 – RECONCILIATION WITH DATA QUALITY OBJECTIVES

Data assessment is a systematic process of reviewing data against a set of criteria to identify outliers or errors and to delete suspect values or to flag them for the user. The QC data produced are reviewed by the analyst, a second analyst/supervisor (peer review), the Reports Group, Project Manager, and QA staff throughout sample analysis and data generation using the criteria and procedures described in this section to validate data integrity during collection and reporting of analytical data. Data review checklists are used to document the performance and review of the QC and analytical data.

Review of analytical and QC data are initially preformed by the responsible analyst. The data are checked for errors in transcription, calculations, and dilution factors and for compliance with QC requirements. Failure to meet method performance QC criteria may result in the reanalysis of the sample or analytical batch. After the initial review is completed, the data are collected from summary sheets, workbooks, or computer files and assembled into a data package.

The next level of data review is the responsibility of a second analyst or supervisor who is charged with a 100% data review of the data package.

The Reports Group and Project Manager check the data packages for completeness and compliancy with the project requirements. The report narrative is generated at this stage of the data review.

The Quality Assurance Manager is responsible for 5 percent review of all laboratory reports and for the review and closure of all non-conformance memos.

The areas routinely reviewed at all levels include the following:

- Proper COC and sample handling procedures followed.
- Parametric holding times met.
- Samples prepared and analyzed according to specified methods.
- Instrumentation calibrated according to specified methods.
- Spike (surrogate or standard) recoveries within specified ranges.
- Blanks prepared and analyzed as required.
- Calculations performed correctly and verified.
- Transcriptions of raw and final data are correct.
- Detection limits are correct.

Any problems discovered during the review and the corrective actions necessary to resolve them are communicated to the responsible Section Supervisor or Department Manager, who discusses the findings with the QAM for resolution.

The QA/QC program is to be regularly and formally assessed in terms of the adequacy of and compliance with the program; the effectiveness of established controls, procedures, and systems; and the adequacy of resources to achieve and ensure quality on project activities. Audit activities are to correspond to the type of work being evaluated and its significance within the context of the project. Results of auditing activities are to be documented and included in the permanent project file. To the extent practical, on-site audits and reviews are to be conducted during early stages of activities to evaluate the planning, design, execution, and documentation of quality-affecting activities and to help identify and correct problems in a timely manner. Specific audit actions are described in the following subsections.

<u>Internal Audits</u>

The laboratory QAM conducts routine internal audits of each laboratory section for completeness, accuracy, and adherence to standard operating procedures. The audit team is to verify that the laboratory's measurement systems are operated within specified acceptable control criteria, and that a system is in place to ensure that out-of-control conditions are efficiently identified and corrected.

Data Audits

Raw instrument data for GC, HPLC, and GC/MS analyses are maintained on magnetic tape media or optical media by the laboratory's LAN Administrator in a secured fireproof safe. During routine audits, the audit team will verify the processing of the raw data file by reviewing randomly selected electronic data files and comparing the results with the hardcopy report. Tapes are archived for a period of three years. Tapes are also available for audit by regulatory agencies upon request.

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April 30, 2007

MEMORANDUM OF UNDERSTANDING
BETWEEN
U.S. ARMY CORPS OF ENGINEERS, SOUTH ATLANTIC DIVISION
AND
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 4
ON
OCEAN DREDGED MATERIAL DISPOSAL

I. INTRODUCTION

A. **Purpose**. This Memorandum of Understanding (MOU) is intended to facilitate the implementation of Title I of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (MPRSA), 33 U.S.C. Sections 1411 – 1421, with respect to ocean dredged material disposal and to establish the basis for cooperative efforts between the U.S. Environmental Protection Agency (EPA) Region 4 and the U.S. Army Corps of Engineers (USACE) South Atlantic Division (SAD), consistent with statutory and regulatory authority and responsibility. The provisions in this MOU are intended to result in a timely and cost-effective approach that optimizes the use of resources available to each agency. A previous MOU between EPA Region 4 and USACE SAD was signed in July 1990 and expired in September 2002.

B. **Scope**. There are three distinct, but interrelated activities for which EPA and/or USACE have responsibilities, with respect to ocean disposal of dredged material. These are designation or selection of sites for ocean disposal of dredged material, evaluation of the suitability of dredged material for ocean disposal, and management and monitoring of Ocean Dredged Material Disposal Sites (ODMDSs) to ensure compliance with the MPRSA. This MOU addresses the respective responsibilities and program procedures related to those three activities, as well as review of permit conditions/construction contract specifications and enforcement, as they involve ocean disposal of dredged material.

C. **Applicability**. Nothing in this MOU is intended to alter any specific statutory and regulatory authorities or responsibilities assigned to EPA Region 4 or USACE SAD. This MOU does not create any right or benefit, substantive or procedural, enforceable by law or equity against EPA Region 4 or USACE SAD, their officers or employees or any other person. This MOU does not apply to any person outside EPA Region 4 and USACE SAD.

D. **Authorities.**

1. The MPRSA assigns basic responsibility to EPA and USACE for ensuring that ocean dredged material disposal activities will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment (MPRSA Sections 102 and 103).
    a. Section 102 of the MPRSA authorizes EPA to designate sites or times at which dumping may occur and to establish criteria for reviewing and evaluating permit applications, including those for dredged material. It

also authorizes EPA, in conjunction with USACE, to develop site management plans for dredged material disposal sites.

   b. Section 103 of the MPRSA authorizes USACE to issue permits subject to compliance with the EPA environmental criteria (Ocean Dumping Criteria at 40 CFR Part 227) and EPA concurrence with USACE finding of compliance. Section 103(b) authorizes USACE, with EPA concurrence, to select alternative project sites of limited duration for disposal of dredged material in ocean waters when the use of a site designated by EPA is not feasible.

2. EPA regulations for implementation of the MPRSA are found at 40 CFR Parts 220-229. USACE regulations for permitting and Federal authorizations of Operations and Management (O&M) navigation and dredging projects are found at 33 CFR Parts 320-325 and Parts 335-338, respectively.
3. Sections 105 and 107 of the MPRSA include provisions outlining the authorities available to EPA and USACE in the event of violations of the MPRSA, regulations promulgated pursuant to the MPRSA or permits issued under the MPRSA.

II. DEFINITIONS & DESCRIPTION OF TERMS USED IN MOU

- Criteria: The Ocean Dumping Criteria found at 40 CFR Parts 227 and 228.
- Baseline Studies: Characterization of the physical, chemical and biological aspects of an ocean disposal site prior to the designation of the site for disposal of dredged material.
- District(s): USACE District offices within the South Atlantic Division.
- Section 102 ODMDS: An ocean dredged material disposal site designated through rulemaking by EPA for the disposal of dredged material.
- Section 103 ODMDS: An ocean dredged material disposal site selected by USACE for a specific project when the use of a Section 102 ODMDS is not feasible.
- Section 103 Evaluation: An evaluation of the suitability of dredged material for ocean disposal. This includes an assessment pursuant to the Ocean Dumping Criteria found at 40 CFR Part 227. If a Section 103 ODMDS is being selected as part of the project, this evaluation also includes as an assessment pursuant to the criteria found at 40 CFR Part 228.
- Site Management and Monitoring Plan (SMMP): A plan, as required by Section 102(c)(3) of the MPRSA, that includes, among other things, the baseline assessment of conditions at an ocean disposal site and includes a monitoring program, special management conditions or practices, consideration of the quantity of material to be disposed of at the site, consideration of the anticipated use of the site, schedule for review of the plan, and special management conditions or practices necessary for protection of the environment.
- Site Monitoring Program: The site monitoring program is part of the SMMP and includes activities related to evaluation of the impacts of dredged material dumping at the specific site, including but not limited to field surveys, data acquisition and analysis, and preparation of management reports.

- Southeast Regional Implementation Manual (RIM): A document jointly developed by EPA Region 4 and USACE SAD to implement the national testing guidance and coordination procedures.

III. SITE DESIGNATION/SELECTION OR MODIFICATION

Under Section 102 of the MPRSA, EPA is authorized to designate sites and time periods for dumping. EPA site designations are published in the Federal Register at 40 CFR Part 228. Site designations include a description of the site, the type of material for which the site is designated, and any restrictions on site use established by EPA. Under Section 103(b) of the MPRSA, USACE has the authority to select sites, consistent with EPA review authority under the MPRSA, when the use of a site designated by EPA (a Section 102 ODMDS) is not feasible.

A. Section 102 ODMDS Designation/Modification and Coordination.

1. The procedures for Section 102 ODMDS designation and coordination are:
   a. When the District has determined the need for a Section 102 ODMDS or a modification to a Section 102 ODMDS, the District provides a written request from the District Engineer to the Regional Administrator requesting a site designation or modification prior to any EPA Region 4 action.
   b. The request should include at a minimum the following:
      i. A detailed description of the need for an ODMDS including an evaluation of alternatives to ocean disposal. Where the need is based on a Federal civil works project, the authorization and supporting documentation (e.g. Feasibility Study, Dredged Material Management Plan) should be provided. Where an ODMDS is necessitated by a permit application, the District should provide an independent evaluation of the need for an ODMDS following the guidance in the *Framework for Dredged Material Management* (EPA842-B-92-008).
      ii. An estimate of the long-term (10-25 years) use of the site (quantity of material) and a preliminary estimate of the size (square nautical miles) of the ODMDS needed.
      iii. The zone of siting feasibility including the economic and logistical factors that went into formulation of the zone.
      iv. A projected date by which the ODMDS action is needed and a timeline for meeting that goal.
      v. A preliminary assessment of significant issues that might arise from site designation.
   c. Following receipt of the request, EPA Region 4 and the District make an initial determination as to whether a voluntary Environmental Impact Statement (EIS) or Environmental Assessment (EA) is needed and coordinate a schedule for completing the site designation or modification.
   d. EPA Region 4 confirms the determination and schedule in a letter from the EPA Region 4Water Management Division Director to the relevant District Engineer.

   e. If an EIS is needed, EPA Region 4 makes every effort to prepare a Notice of Intent to prepare a voluntary EIS within 45 days of this letter.
   f. EPA Region 4 and the District should begin the ODMDS designation by identifying the responsibilities of each agency in the process relative to the issues specific to the particular site being designated. EPA Region 4 and the District may also enter into an interagency agreement (IAG) pursuant to the Economy Act or the cooperative authority of Section 203 of the MPRSA to gather information required to prepare the National Environmental Policy Act (NEPA) documentation most efficiently.
2. EPA Region 4 and USACE SAD plan to review all Section 102 ODMDS designation actions under EPA's Statement of Policy for Voluntary Preparation of NEPA-Documents (See 63 FR 58045 [October 29, 1998], "Notice of Policy and Procedures for Voluntary Preparation of National Environmental Policy Act (NEPA) Documents.") EPA Region 4 is to be designated as the lead agency, with the District as a cooperating agency. Other agencies (e.g., Minerals Management Service, U.S. Navy) may be invited to cooperate on a case-by-case basis.
3. The Districts intend to take the lead in the scoping process, which will identify any significant issues which should be addressed in the voluntary NEPA document. The Districts intend to conduct scoping in close coordination with EPA Region 4 to ensure all appropriate information is gathered and applicable guidance is followed. EPA Region 4 intends to initiate any necessary coordination under other statutory provisions (e.g. Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act [Essential Fish Habitat], and Coastal Zone Management Act).
4. Where a Federal civil works project establishes the need for an ODMDS, EPA Region 4 and USACE SAD anticipate that the Districts would provide EPA Region 4 with the necessary information to be used in preparation of the Draft voluntary NEPA document and coordination documents.
5. Where an ODMDS is necessitated by a permit application, (e.g., a port authority or U.S. Navy), EPA Region 4 and the USACE SAD anticipate that the permit applicant would provide the necessary information to be used in preparation of the Draft voluntary NEPA document and coordination documents. EPA Region 4 intends to work closely with the District or the District and the applicant, as the case may be, in the collection and analysis of the required information as resources allow. Agency collaboration and utilization of the expertise, resources and initiative of EPA Region 4 and the Districts in site designation activities is encouraged as the most efficient and effective means for achieving the goals of the MPRSA.

B. **Voluntary NEPA Documents for Section 102 ODMDSs**. Guidance for baseline studies is provided in *Revised Procedural Guide for Designation Surveys of Ocean Dredged Material Sites* (Pequegnat et. al. 1990). Guidance on the site designation process including the EIS development process is provided in the EPA document, *Ocean Dumping Site Designation Delegation Handbook* (EPA, 1986). EPA Region 4 and USACE SAD intend to follow, as appropriate, the procedures set out in the Council of Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508). Further, EPA Region 4 and USACE SAD anticipate that an ODMDS voluntary NEPA document would include the following:

1. Need for Ocean Disposal and Alternatives. The Districts should provide a narrative and supporting documents (e.g., disposal area study, dredged material management plan, feasibility study) to support the need for ocean disposal of dredged material and alternatives to the proposed action. This narrative is a more detailed discussion and update of the information provided in III.A.1.b above. It should include a discussion of the need for the dredging project, the cost, environmental effects, availability and reliability of other options for placement of dredged material. Any long-range plans for maintenance of the project should be described. In addition, Congressional project authorization should be discussed, especially if ocean disposal was identified as part of the authorized project.
2. Criteria for Site Evaluation. The 5 general (40 CFR § 228.5) and 11 specific (40 CFR § 228.6) criteria in EPA's Ocean Dumping Regulations are expected to be used to evaluate the potential sites for ocean disposal. The criteria should be applied to all alternative ODMDSs to assist in selecting a preferred ODMDS. Data from existing literature, field surveys, or model applications may be utilized in evaluating a potential site against these criteria. Particular emphasis should be given to the following issues:
    a. Water Current and Dispersion Analysis. An assessment of the hydrologic regime at the proposed ODMDS, emphasizing those features, which may cause movement of disposed sediments, should be included in the NEPA document. These assessments should be performed utilizing current technology (e.g. current meter and wave sensor deployments) including numerical modeling as appropriate. The need for numerical modeling should be based on the physical aspects of the site, nature of the material proposed for disposal, and significance and location of resources. This information should also be used to determine the appropriate size of the proposed ODMDS.
    b. Material Proposed for Disposal. A description of the materials proposed for disposal including projected sources, quantity, physical-chemical properties, and results of material suitability surveys. To the extent practicable, the NEPA document should include projections for the next 10 to 25 years.
    c. Historical Record of Disposal. If the proposed site has been used historically for the placement of dredged material, the voluntary NEPA document should include a record of the last five years of disposal activities, at a minimum, including quantity, material type, and date.
    d. Existence of Hard/Live Bottom Habitats. Documentation of the existence of these resources should be included in the voluntary NEPA document. Summaries from video surveys and side scan sonar surveys are appropriate documentation for the existence and extent of hard/live bottom habitats.
    e. Cultural Resources. Cultural resource surveys may include literature, magnetometer and side scan sonar, or diver surveys. All cultural resource results should be coordinated with the appropriate State Historic Preservation Officer.

3. Endangered Species Act (ESA) Biological Evaluation (BE). Pursuant to Section 7(a)(2) of the ESA and implementing regulations (50 CFR § 402), a Federal agency is required to ensure, in consultation with the Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS), depending on the species involved, that actions it authorizes, funds, or carries out are not likely to jeopardize the continued existence of federally-listed endangered or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. Appropriate biological evaluations assessing impacts, if any, on listed species and designated critical habitat should be prepared and included as an appendix to the voluntary NEPA document. EPA Region 4 expects to initiate ESA Section 7 consultation (if required) with the NMFS and/or the FWS concurrent with the distribution of the Draft voluntary NEPA document.
4. Essential Fish Habitat (EFH) Assessment. Pursuant to section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Federal agencies are required to consult with the NMFS regarding any action they authorize, fund, or undertake that may adversely affect EFH. An EFH Assessment is intended to be prepared and included as an appendix to the voluntary NEPA document. EPA Region 4 plans to initiate EFH consultation (if required) with the NMFS concurrent with the distribution of the Draft voluntary NEPA document.
5. Coastal Zone Consistency Determination. Consistent with section 307(c) of the Coastal Zone Management Act and implementing regulations at 15 CFR Part 930, EPA Region 4 will evaluate proposed site designations for consistency with the appropriate State's approved coastal management program as an agency "activity." A consistency determination is to be prepared and included as an appendix to the voluntary NEPA document. EPA Region 4 intends to submit this determination to the appropriate State(s) in accordance with the timeframes and procedures set forth in 15 CFR Part 930. Generally this submission occurs concurrent with the distribution of the Draft voluntary NEPA document.
6. Site Management and Monitoring Plans (SMMPs). Pursuant to Section 102(c)(4) of the MPRSA, EPA is required to develop SMMPs prior to final designation. To the maximum extent feasible, EPA Region 4 intends to coordinate SMMPs as part of the voluntary NEPA document. Distribution of the draft SMMP in the voluntary NEPA document is intended to fulfill the public comment provisions of Section 102(c)(3) of the MPRSA. EPA Region 4 and the District intend to work cooperatively to develop these plans. SMMP development is discussed further in Section VI below.

C. Section 103 ODMDS Selection.

1. The criteria used in designating an ODMDS, pursuant to Section 102 of the MPRSA, shall also be used in selecting a Section 103 disposal site [MPRSA § 103(b)]. EPA Region 4 and USACE SAD expect the District to provide necessary and appropriate information concerning the permit to EPA Region 4. Analysis of the criteria may be provided to EPA Region 4 in the form of a NEPA document, Public Notice or Section 103 Evaluation.
2. As Section 103 ODMDSs are selected as part of a permit action or USACE project, the same coordination and review procedures apply to the site selection as to the dredged material evaluation (see IV.B below). EPA Region 4 will review and make an independent determination of compliance within 45 days of receipt of all necessary information [MPRSA § 103(c)(2)]. Within 30 days from the receipt of the information, EPA Region 4 will determine if all necessary information has been supplied and request any needed information from the District [MPRSA § 103(c)(1)]. EPA Region 4 may request and the District will grant one 45-day extension [MPRSA § 103(c)(2)]. EPA Region 4 may concur, concur with conditions or decline to concur [MPRSA § 103(c)(2)].
3. Pursuant to MPRSA §103(b), use of any alternative site selected by the District is limited to five years, except that such a site may continue to be used for up to five additional years if:
   a. no feasible disposal site has been designated by the EPA Regional Administrator;
   b. the continued use of the alternate site is necessary to maintain navigation and facilitate interstate or international commerce; and,
   c. the EPA Regional Administrator determines that continued use of the site does not pose an unacceptable risk to human health, aquatic resources, or the environment.
4. When a site is not used continuously, the original and extension periods do not need to be continuous. If an extension is considered by the District to be necessary, EPA Region 4 and USACE SAD anticipate that the District would provide an evaluation of whether there is a future need for designation of a Section 102 ODMDS and provide this evaluation with the extension request. If the extension occurs more than 10 years after the original site selection, EPA Region 4 and the USACE SAD intend to re-initiate steps 1 and 2 above.

IV. EVALUATION OF DREDGED MATERIAL FOR OCEAN DISPOSAL

MPRSA § 103(b) and 40 CFR § 227.13 of the Ocean Dumping Regulations require that dredged materials be evaluated prior to disposal in ocean waters.

A. **Dredged Material Testing and Evaluation.** Guidelines relating to the evaluation of dredged material are contained within *Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual* (EPA and USACE, 1991). This manual, more commonly known as the "1991 Green Book", includes a description of the tiered approach to sediment testing. Included in the manual are methods and procedures for sediment sampling and testing, general guidance on bioassay and bioaccumulation testing, as well as an overview of data analyses and quality control/assurance procedures. In addition, in 1993, EPA Region 4 and USACE SAD developed a Regional Implementation Manual (RIM), which implements the national guidance. Both documents are currently under review and revision by EPA and USACE. EPA Region 4 and USACE SAD intend to use the 1991 Green Book and 1993 RIM until the revisions become final, at which time the revised Green Book and RIM will be used.

1. **Evaluation of Initial or New Work Sediments.** EPA Region 4 and USACE SAD anticipate that baseline sediment testing [i.e., sediment chemistry, elutriate chemistry (if necessary) and toxicity, sediment toxicity and sediment bioaccumulation] would be performed on all sediments proposed for ocean disposal for the first time or on new work dredged material, unless it can be shown that those sediments meet the exclusionary criteria of 40 CFR § 227.13(b). Materials are to be evaluated in accordance with existing regulations, the Green Book and the RIM. Districts are expected to coordinate with EPA Region 4 prior to implementing the baseline evaluation program. EPA Region 4 and USACE SAD anticipate that advance coordination would include, at a minimum, the development of a Sampling and Analysis Plan (SAP) by the District [the applicant in the case of permit applicants], which would be approved by EPA Region 4 [and the District in the case of permit applicants] prior to initiation of sampling.

2. **Re-evaluation of Routine Maintenance Dredged Sediments.** EPA Region 4 and USACE SAD anticipate that re-evaluation of dredged material associated with routine channel maintenance would occur on a periodic basis in order to document the continued suitability of dredged material for ocean disposal. Recommended re-evaluation intervals are discussed in the RIM. In general, at a minimum, a Tier I review should be conducted no less frequently than every three years or at permit renewal for projects permitted through the regulatory program (the duration of USACE permits for the transport of dredged material for the purpose of ocean disposal is limited by 33 CFR § 325.6 to three years). Previous Tier III testing may be utilized to demonstrate compliance with the Criteria when it can be demonstrated that the earlier testing continues to be representative of the current project and that the

material is essentially the same as it was when last sampled. Results from repeated physical, chemical and/or biological testing of maintenance material may be used to demonstrate that material is consistent from one dredging cycle to the next and essentially the same as when last sampled and analyzed under Tier III. When such consistency has been demonstrated, the frequency of Tier III testing may be reduced. However, EPA Region 4 and the USACE SAD recommend that Tier III testing be conducted at intervals not to exceed 10 years. When new sources of pollution have developed in a project area, prior Tier III results would be deemed no longer representative and new Tier III sampling and analysis would be initiated. EPA Region 4 and USACE SAD also expect that more frequent Tier III sampling and analysis would be required when the project area has a high risk for pollution. Dredging plans involving use of ODMDSs and associated environmental issues and testing should be discussed and documented during ocean disposal coordination meetings. The coordination meetings are discussed further in Section VIII below. EPA Region 4 and USACE SAD expect that SAP development for re-evaluation efforts would follow the coordination procedures outlined in IV.A.1 above.

B. **Permit/Project Authorization Processing and Coordination**. Relative to evaluation of dredged material, EPA Region 4 and the USACE SAD intend that the District would be the primary contact point for the applicant. All meetings and information submittals involving the applicant or requests for information should be coordinated through the District. To avoid unnecessary duplication and delay, the District(s) should involve EPA Region 4 in the pre-application process as early as possible. For Federal projects, the pre-application stage refers to the project formulation stage. At the pre-application/project formulation stage, EPA Region 4 and the District intend to address or the District intends to involve EPA Region 4 relative to the following:

1. An analysis of alternatives demonstrating the need for ocean disposal.
2. A review of existing information regarding the quality of the sediments.
3. A determination of additional information needs.
4. The design of a sampling plan to include the method of sampling, the number and location of samples, and the proposed sample analyses including contaminants of concern and the appropriate analytical methods, including detection limits.
5. The identification of transportation and disposal options and limitations.

Following testing (if needed), and evaluation of the proposed dredged material, and pursuant to Section 103(c) of the MPRSA, documentation of the evaluation and the District's determination of compliance with the Criteria will be provided to EPA Region 4 by the District in the form of a Section 103 Evaluation and Testing Report. Guidance on Section 103 Evaluations and Testing Reports is provided in the RIM. MPRSA § 103(c) provides the timelines for EPA review of the Section 103 Evaluations and Testing Reports. This includes a 30-day review period for adequacy, a 45-day review period for compliance with the Criteria and an additional 45-day extension if requested by EPA.

EPA Region 4 has 30 days from receipt of Section 103 Evaluation and Testing Report to review the information and request any additional information [MPRSA § 103(c)(1)]. Once all necessary information to evaluate the material, including additional information requested, has been received by EPA Region 4, the initial 45-day review period begins. If needed, EPA Region 4 may request, and the District is required to grant, one 45-day extension [MPRSA § 103(c)(2)].

Within the timeframes outlined above, EPA Region 4 intends to provide a letter concurring (entirely or with conditions) or declining to concur with the determination of the District with respect to compliance with the Criteria. Pursuant to MPRSA § 103(c), Districts will not issue any MPRSA Section 103 ocean disposal permit or commence or authorize to be commenced any ocean disposal activity without prior written concurrence from EPA Region 4 except in cases where EPA Region 4 has not responded within the time frames outlined above, pursuant to MPRSA § 103(c)(4) or when the waiver provisions of MPRSA § 103(d) have been invoked.

Additional details on coordination procedures and timeframes are provided in the RIM.

C. **Permit/Project Authorization Modification.** Should a project be modified following permit issuance or subsequent to EPA Region 4's concurrence on the MRPSA Section 103 Evaluation, the District is expected to consult with EPA Region 4 prior to modifying the permit or authorizing the commencement of the ocean disposal activity related to the modification. Modification could include, but is not limited to, the following: increase in the volume of material, change in the characteristics of the material, recent contamination of the material due to spills or discharges of pollutants, change in project limits either in the dredging depth or width, or the addition of areas to be dredged. Consultation should be in writing and include a detailed description of the modification, an addendum to the MPRSA Section 103 Evaluation (if needed), and a determination as to whether the modified project complies with the Criteria. EPA Region 4 intends to follow the procedures and timeline outlined in paragraph B above and provide a letter concurring (entirely or with conditions) or declining to concur with respect to the modification. If additional information is needed, such as additional testing, EPA Region 4 intends to provide such notification within 30 days of receipt of the written description of the modification. As modifications typically occur during a project, and delays can result in substantial costs, EPA Region 4 should be consulted as early as possible. EPA Region 4 intends to make every effort to accelerate reviews of modifications.

V. MANAGEMENT AND MONITORING OF ODMDSs

Pursuant to Section 102(c) of the MPRSA, EPA has overall responsibility for management and monitoring of Section 102 ODMDSs. It is in the best interest of EPA Region 4 and USACE SAD to act in partnership concerning the management and monitoring of all ODMDSs. This MOU provides the vehicle for this partnership.

A. **Site Management and Monitoring Plans.** SMMPs are required for each Section 102 ODMDS [MPRSA § 102(c)(3)]. No permit or authorization may be issued for use of a Section 102 ODMDS unless an approved and current SMMP has been developed pursuant to Section 102 [MPRSA § 102(c)(4)]. Under the MPRSA, permits and construction contract specifications for use of the site must include requirements, limitations or conditions that are necessary to assure consistency with the approved SMMP [MPRSA §§ 103(e), 104(a)(4)]. EPA is to develop SMMPs in conjunction with the Districts [MPRSA § 102(c)(3)]. General guidance on the development of SMMPs is provided in the EPA/USACE February 1996 document, *Guidance Document for the Development of Site Management Plans for Ocean Dredged Material Disposal Sites*. The SMMP may be revised by EPA in conjunction with the District based on changes in disposal needs, changes in the site environment, or as a result of information obtained from previous SMMP activities.

B. **SMMP Content.** Site management objectives include the protection of the marine environment through avoidance of unreasonable degradation and assuring material suitability. Management objectives may also include beneficial uses of dredged material. Material volume, timing of ODMDS use, division of the site by material type or user, among others, may be elements of the SMMP.

   Site monitoring objectives include assuring protection of the marine environment and may include determination of material movement, environmental effects of disposal, stability of structure, or development of new habitat. The site monitoring plan will typically include pre-disposal, disposal, and post-disposal phases as well as trend assessment studies. Section 102(c)(3) of the MPRSA provides the minimum requirements for site management plans. EPA Region 4 and USACE SAD anticipate that the following would be addressed by the SMMPs for ODMDSs within EPA Region 4 and USACE SAD:

   1. A baseline assessment of conditions at the site [MPRSA § 102(c)(3)(A)]. This should use existing and collected information as appropriate. If the site has been previously used, this should include a summary of past monitoring activities and conclusions from those efforts.
   2. A program for monitoring the site [MPRSA § 102(c)(3)(B)]. This should include the responsible agency(ies) for each monitoring activity, and a description of when, and under what situations, monitoring activities will be undertaken subject to the financial limitations of the responsible agency.
   3. Special management conditions or practices to be implemented that are necessary for protection of the environment [MPRSA § 102(c)(3)(C)]. Disposal zones should be established to maintain disposal mounds within the

ODMDS boundaries, to ensure compliance with applicable water quality criteria or standards and/or to protect nearby marine resources. The SMMP should also establish maximum volumes (by project, per year and/or cumulative total) for the ODMDS where necessary.

4. Consideration of the quantity of material to be disposed of at the site [MPRSA § 102(c)(3)(D)]. This should include a history of disposal activities at the ODMDS and whether projected use is likely to exceed the site capacity.
5. Consideration of the presence, nature, and bioavailability of the contaminants in the dredged material at the site and its vicinity [MPRSA § 102(c)(3)(D)]. Trend assessment surveys and dredged material evaluations typically provide this information. The SMMP should include as an appendix the appropriate input parameters for water quality modeling of disposal plumes.
6. Consideration of the anticipated use of the site over the long term, including the anticipated closure date of the site, if applicable, and any need for management of the site after the closure of the site [MPRSA § 102(c)(3)(E)]. This should include a 10-year projection of site use by site user(s).
7. Disposal monitoring requirements. The SMMP should include requirements for an electronic vessel tracking system that tracks the following: vessel name, load number, volume of material, material description, source of material, and the time, draft and vessel position between the dredging location and the ODMDS. The system should also record the position of the initiation and completion of disposal operations.
8. Reporting Requirements. The SMMP should include requirements for reporting results of SMMP monitoring and management activities. This should include post disposal reports summarizing disposal activities, such as dates of disposal, disposal locations, disposal volumes and pre and post bathymetry survey results if required.
9. Generic or draft permit conditions and construction contract specifications. The SMMP should include as appendices generic or draft permit conditions and construction contract specifications applicable to the requirements of the SMMP. These conditions can be referenced by the permit or contract writer to ensure that SMMP conditions have been incorporated into the appropriate documents.
10. A schedule for review and revision of the SMMP not to exceed ten (10) years [MPRSA § 102(c)(3)(F)].

C. **SMMP Development and Review.** For new Section 102 ODMDSs, EPA Region 4 and USACE SAD intend that SMMPs would be developed as part of the site designation voluntary NEPA document. EPA Region 4 and USACE SAD further intend that the SMMP would be included as an appendix to the voluntary NEPA document (see III.B.6 above). SMMPs are to be developed by EPA in conjunction with the Districts [MPRSA § 102(c)(3)]. EPA Region 4 and USACE SAD intend that SMMPs would be considered complete and approved upon signature by the EPA Region 4 authorized official and the respective USACE District Engineer.

D. **SMMP Revision and Modification.** Section 102(c)(3)(F) of the MPRSA requires that the plans be reviewed and revised no less frequently than 10 years after adoption of the plan and every 10 years thereafter. SMMPs that have not been reviewed and revised within 10 years of adoption/revision will not be considered approved and current. No permit or authorization may be issued for use of a Section 102 ODMDS unless an approved and current SMMP has been developed pursuant to Section 102 [MPRSA § 102(c)(4)].

An opportunity for public comment is required in the development and revision of the SMMPs [MPRSA § 102(c)(3)]. Every reasonable effort should be made to obtain the views of other federal, state and interested local, public and private entities in the development and revision of the plans. At a minimum, such entities should include the state Coastal Zone Management Agency, NMFS Habitat Protection Division, NMFS Protected Species Division (if ODMDS lies within or near critical habitat), and local site users. A joint EPA Region 4 and District notice of availability for review of the draft revised SMMP should, in most cases, be published in a local newspaper, the Federal Register, through circulation of a public notice using distribution similar to that used for permit notification, or a combination of these techniques. In some cases, the draft revised SMMP may be published as part of a USACE dredging project NEPA document and may utilize that document's review process to obtain public comments instead of the procedure above. It is recommended that the draft revised SMMP be available for review for at least 30 days prior to final approval. As the Districts have greater knowledge of local resource agencies and public stakeholders, Districts intend to publish the notice of availability unless EPA Region 4 and the District agree to do otherwise. The draft revised SMMPs are expected to be distributed by EPA Region 4 to the agencies listed above for comment. Public comments received during the review process are expected to receive full consideration by EPA Region 4 and the District prior to final approval of the SMMP. Revisions to SMMPs are considered complete upon signature by the EPA Region 4 authorized official and the respective District Engineer.

In some cases a SMMP may need only minor modifications without full revision. This may be the case, for example, when only a small portion of the plan is being revised prior to its scheduled review date or when little activity has occurred at the site. Proposed modifications are expected to undergo public review as detailed above and approval of SMMP modification can be in the form of a letter from the EPA Region 4 authorized official to the appropriate District Engineer.

E. **Implementation and Limitations.** Consistent with Section 102(c)(3) of the MPRSA, the SMMP developed by EPA Region 4 in conjunction with the District shall include a program for monitoring the site that includes the responsible agency(ies) for each monitoring activity. Each Agency will bear its own costs for activities it undertakes in furtherance of the responsibilities established in the SMMP except as provided for in duly executed IAGs pursuant to the Economy Act or the cooperative authority of Section 203 of the MPRSA. IAGs between EPA Region 4 and the Districts are encouraged in order to pool resources to implement SMMP activities. The SMMP and, as applicable, permit conditions will also specify when site users will be required to undertake monitoring activities associated with their projects in accordance with 40 CFR § 228.9.

All commitments made by EPA Region 4 and USACE SAD in this MOU are subject to the availability of appropriated funds and each Agency's budget priorities and financial control policies and procedures. This MOU, in and of itself, does not obligate either EPA Region 4 or USACE SAD to enter into any contract, grant or interagency agreement.

F. **Data Management**. The maintaining and sharing of data between EPA Region 4 and the Districts is essential to effective decision-making. The level of detail, format of data, and timetable for transfer will be included in the SMMP. To the greatest extent possible, all data should be provided in a mutually agreeable electronic format to enable data management, analysis and distribution. EPA Region 4 and the USACE SAD intend to develop standard data formats to enable use of the data by both agencies.

VI. PERMIT CONDITIONS AND CONSTRUCTION CONTRACT SPECIFICATIONS

Projects authorized under a MPRSA Section 103 permit include projects that involve applicants, and include those projects that USACE manages for other federal agencies. Pursuant to USACE policy, projects managed by USACE for other federal agencies have both a MPRSA Section 103 permit and construction contract conditions implementing the terms of the permit. USACE also conducts federally authorized navigation projects (Army Civil Works Projects). However, USACE does not issue a permit document to authorize its activities. Section 103(e) of the MPRSA provides that USACE may, in lieu of permit procedures, issue regulations for federally authorized navigation projects. These regulations are found at 33 CFR Parts 335 through 338 and provide for inclusion of appropriate conditions in the construction contract specifications for environmental compliance. Permit conditions and/or construction contract conditions are intended to adequately control dredged material transport and disposal activities and deter and penalize violations of the MPRSA.

Sections 104(a) and 103(c) of the MPRSA provide authority for conditioning of permits. Standardized permit and construction contract conditions should be developed for each ODMDS consistent with MPRSA § 104(a). These should typically be developed as part of the SMMP. The standardized permit and construction contract conditions are intended to only address issues related to the transport and ocean disposal of the dredged material and implementation of the SMMP. It is understood that additional conditions may be needed to address other aspects of the project consistent with USACE permitting regulations and contracting requirements and that project specific special conditions may be needed to ensure compliance with the Criteria. The standardized permit and construction contract conditions should be periodically reviewed for workability and effectiveness based on program experience.

A. **Standard Conditions**. Section 104(a) of the MPRSA requires the following conditions:
   1. a description of the material [MPRSA § 104(a)(1)];
   2. the amount of dredged material, including the maximum amount allowed under the permit [MPRSA § 104(a)(2)];
   3. the location where dumping will occur (e.g. disposal site and/or disposal zone) [MPRSA § 104(a)(3)];
   4. any restrictions to assure consistency with the SMMP [MPRSA § 104(a)(4)];
   5. any provisions for the monitoring and surveillance of the disposal activities (e.g. Silent Inspector) [MPRSA § 104(a)(5)]; and,
   6. such other matters as EPA or USACE deems appropriate [MPRSA § 104(a)(6)]. The following conditions are appropriate for all MPRSA 103 permits covered by this MOU:
      a. the beginning and ending date of the disposal activity;
      b. the locations (vertical and horizontal) from which the dredged material may be excavated. This shall include the maximum characterization depth (which includes the paid allowable overdepth and non-pay dredging) consistent with USACE policy (see Civil Works memorandum dated January 16, 2006); and
      c. all restrictions on the use of the disposal site, which are promulgated under 40 CFR Part 228.

B. **Special Conditions**. Pursuant to MPRSA § 103(c), EPA Region 4 (through the concurrence process) and/or the District (as the permit issuing authority or contracting entity) will condition permits or construction contracts, as the case may be, to ensure compliance with the Criteria. Where project-specific special conditions, in addition to those listed in VI.A. above, are requested by EPA Region 4 to ensure compliance with the Criteria, EPA Region 4 plans to provide early drafts of the special conditions to the District for coordination to ensure that the language of such conditions is clear and enforceable. Such conditions are expected to be included as part of the EPA Region 4 concurrence letter and incorporated or attached to the permit or, as appropriate, the construction contract. Where the District disagrees with EPA Region 4's conditions, EPA Region 4 and USACE SAD intend that no permit or construction contract, as the case may be, would be issued until agreement is reached on appropriate conditions.

C. **Submittal of Draft Permit Conditions and Construction Contract Specifications.** The District is expected to submit to EPA Region 4 draft permit conditions or construction contract specifications (limited to those conditions related to the transportation for the purpose of ocean disposal and disposal) as part of the MPRSA Section 103 Evaluation of the dredged material. Following receipt of EPA Region 4's concurrence letter, the District(s) should provide the final draft permit or construction contract specifications at least 15 working days prior to issuance of the permit or no later than 15 working days before advertising for bids. At that time, should any deviations from the terms and conditions agreed upon during the permit or federal project review process exist, they should be clearly identified by the District. EPA Region 4 is expected to submit in writing to the District any objections and justifications for such objections, including withdrawal of concurrence if necessary, within 10 working days from the date of receipt of such documents.

D. **Compliance Data Reporting Conditions.** To facilitate and document compliance and as an aid to site management, all SMMPs should include provisions to ensure that disposal operations are electronically monitored, documented and reported by the site user. To the greatest extent possible, all data should be provided in a mutually agreeable electronic format to enable data management, analysis and distribution. EPA Region 4 and USACE SAD have developed a data transfer format and procedure for disposal operation monitoring data.

VII. ENFORCEMENT PROCEDURES

A. **Enforcement and Permit Revocation/Suspension Authorities**. Under Section 105(a) of the MPRSA, EPA is authorized to assess civil penalties for violations of Title I of the MPRSA, regulations promulgated under Title I or a permit issued under Title I. Upon failure of the offending party to pay a penalty, assessed pursuant to Section 105(a), EPA may request the Attorney General to commence a civil action for such relief as may be appropriate. EPA can also request that the Attorney General initiate an action pursuant to either Section 105(b) (criminal penalties) or Section 105(d) (equitable relief) of the MPRSA.

Under Section 105(f) of the MPRSA, the USACE is authorized to revoke or suspend a permit that it has issued pursuant under Section 103 of the MPRSA, if the provisions of such a permit are violated. USACE may issue cease and desist orders pursuant to 33 CFR § 326.3(c), and may recommend civil or criminal action to the Department of Justice pursuant to 33 CFR § 326.5 Pursuant to the Federal Acquisition Regulations, for federally conducted projects, USACE has authority to enforce the conditions found in construction contracts plans and specifications (e.g. withholding payment, require mitigation, stoppage of work).

Section 107 of the MPRSA provides that EPA and USACE may utilize by agreement the personnel, services and facilities of other agencies in carrying out their responsibilities under the MPRSA. Section 107 also provides that information from the Coast Guard shall be supplied to EPA and the Attorney General as they may require in carrying out their duties relative to enforcement of the MPRSA.

B. **Cooperation**. In any case involving ocean disposal of dredged material, when EPA Region 4 or USACE SAD discovers that a potential violation of the MPRSA, regulations issued pursuant to the MPRSA, a permit issued under the MPRSA, or MPRSA conditions within a construction contract for federally conducted projects has occurred, that agency should advise the other agency within 24 hours (or the next business day) and initiate interagency discussions to determine appropriate enforcement action(s) to be pursued. While each agency retains discretion to take action pursuant to its respective authorities, EPA Region 4 and USACE SAD intend to inform each other as to any determinations to initiate enforcement action or to recommend that enforcement action be taken by the Attorney General on its behalf. Information that could enhance either agency's enforcement efforts is intended to be exchanged between EPA Region 4 and USACE SAD. Such information might include, for example, copies of the contents of the permit file, surveillance reports, disposal vessel tracking records, photographs, bathymetry survey records, and other data or information pertinent to the case, including information involving the same violator in connection with previous investigations or enforcement actions. When either agency completes an enforcement action, pursuant to its authority, it should inform the other agency of completion of its case.

VIII. EPA/USACE PROGRAM COORDINATION

EPA Region 4 and USACE SAD intend to hold a biennial (once every two years) meeting (the "MOU Meeting") to be attended by EPA Region 4, USACE SAD and the Districts to coordinate site designations and SMMP development or review, and to discuss upcoming dredging and disposal projects, permitting issues and dredged material testing issues. In the years in which a MOU meeting is not held, EPA Region 4 intends to visit each District on an as needed basis. At the MOU meetings and the EPA Region 4/District meetings, each District should provide an overview of planned dredging and disposal actions involving ODMDSs for the upcoming fiscal year and discuss any related environmental issues. They should also provide an overview of past activities at each ODMDS and any significant issues related to that use. EPA Region 4 and USACE SAD anticipate that the meetings will be used to establish and update schedules for completing site designations and SMMPs and to discuss reevaluation requirements for future routine maintenance dredging events and evaluation requirements for new projects. EPA intends to provide an overview of monitoring activities at each ODMDS and identify any significant management concerns. EPA Region 4 and USACE SAD anticipate that MOU meetings will also be used to discuss and develop dredged material testing guidance and overall coordination issues for civil works and permitted projects. Participation at these meetings should include, as resources allow, personnel from the various internal organizations within USACE SAD involved in ocean disposal (e.g. regulatory, planning, operations, project management). A memorandum documenting each meeting should be provided to all participants.

IX. GENERAL TERMS AND CONDITIONS

A. **Points of Contact.** USACE SAD, each District, and EPA Region 4 has designated a single point of contact for all interagency coordination on ocean disposal-related matters. Each District and EPA Region 4 has designated a single point of contact for each ODMDS. These designations, as of the time of signature of this document, are included as an appendix. The designations should be updated if the contact person changes.

B. **Duration.** This MOU will be effective for ten (10) years from the date that the last signature is completed. The MOU may be extended at the end of this period by mutual written consent of the parties.

C. **Amendments.** Either party may propose amendments to clarify, expand, or reduce the scope of the MOU. Amendments may be adopted by mutual written consent of both agencies. EPA Region 4 and USACE SAD intend to amend the MOU if the statutory or regulatory provisions or agency policies or procedures reflected in the MOU are themselves amended. Each agency intends to promptly notify the other if such changes occur so that appropriate action on the MOU can be taken.

D. **Termination.** This MOU may be terminated upon receipt of 30 days written notice by either party.

E. **EPA/USACE Coordination.** This MOU is intended to facilitate a consistent regional approach to ocean disposal issues and ODMDS management and to promote coordination between USACE SAD, the Districts, and EPA Region 4. Conflicts between a District and EPA Region 4 concerning the provisions of this MOU, which cannot be resolved, or represent precedent-setting situations affecting other USACE Districts or USACE policy, should be elevated within USACE and EPA for resolution.

J. I. Palmer, Jr.
Regional Administrator
Region 4
U.S. Environmental Protection Agency
27 MAR 2007

Brigadier General Joseph Schroedel
Division Engineer
South Atlantic Division
U.S. Army Corps of Engineers
30 APR 2007

Points of Contact

(* denotes primary contact for interagency coordination within that office)

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ODMDS Contacts

ODMDS	EPA Contact	USACE Contact
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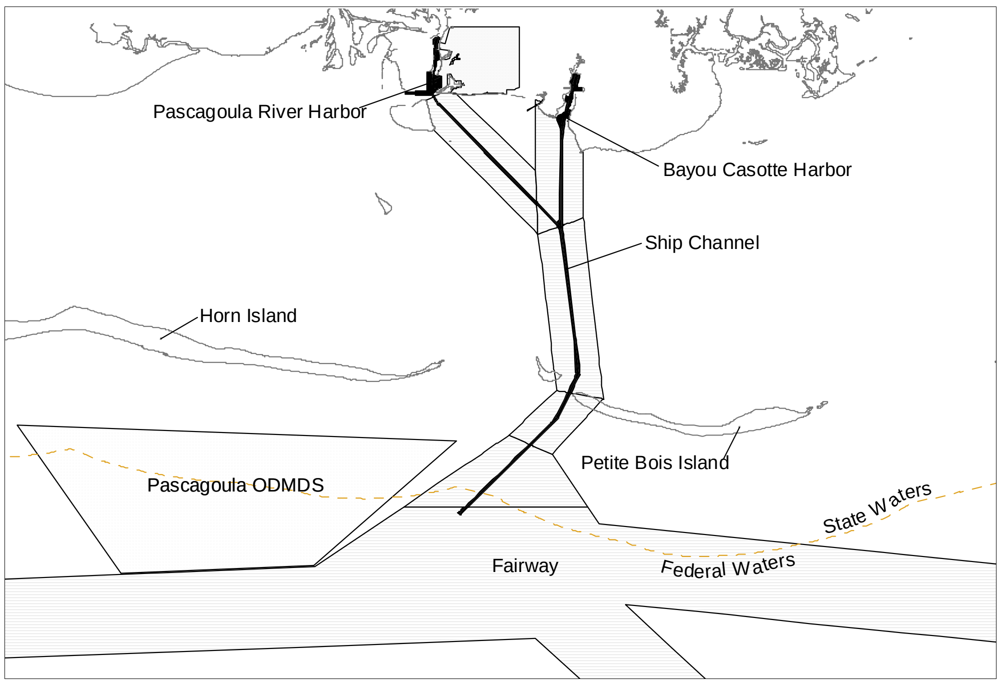
New Wilmington	Gary Collins	Phil Payonk
Wilmington	Gary Collins	Phil Payonk
Georgetown Harbor	Gary Collins	Phil Wolf
Charleston	Gary Collins	Phil Wolf
Port Royal	Gary Collins	Phil Wolf
Savannah	Doug Johnson	Steve Calver
Brunswick Harbor	Doug Johnson	Steve Calver
Fernandina Beach	Chris McArthur	Glenn Schuster
Jacksonville	Chris McArthur	Glenn Schuster
Canaveral Harbor	Chris McArthur	Glenn Schuster
Fort Pierce Harbor	Chris McArthur	Glenn Schuster
Palm Beach Harbor	Chris McArthur	Glenn Schuster
Port Everglades Harbor	Chris McArthur	Glenn Schuster
Miami	Chris McArthur	Glenn Schuster
Key West[1]	Gary Collins	Glenn Schuster
Tampa	Gary Collins	Glenn Schuster
Pensacola Nearshore	Gary Collins	Jennifer Jacobson
Pensacola Offshore	Gary Collins	Jennifer Jacobson
Mobile	Doug Johnson	Jennifer Jacobson
Mobile North[1]	Doug Johnson	Jennifer Jacobson
Pascagoula	Doug Johnson	Jennifer Jacobson
Gulfport East	Doug Johnson	Jennifer Jacobson
Gulfport West	Doug Johnson	Jennifer Jacobson

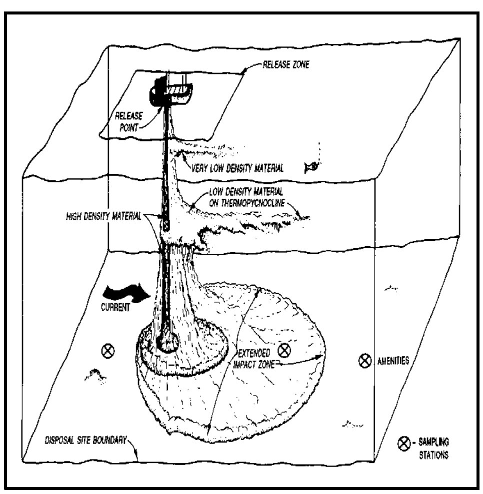
May 2006

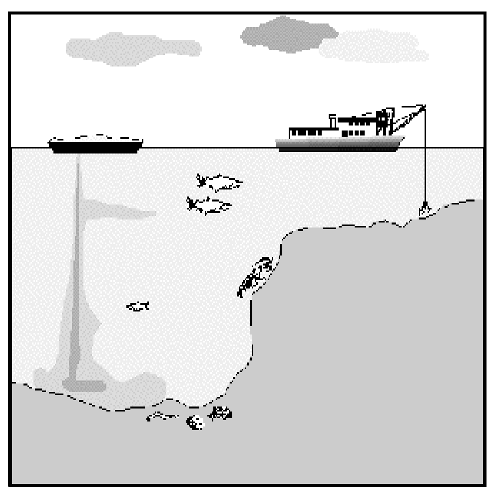
PASCAGOULA
OCEAN DREDGED MATERIAL DISPOSAL SITE

U.S. Army Corps
of Engineers

SITE MANAGEMENT AND MONITORING PLAN







The following Site Management and Monitoring Plan (SMMP) for the Pascagoula Ocean Dredged Material Disposal Site (ODMDS) has been developed and agreed to pursuant to the Water Resources Development Act Amendments of 1992 (WRDA 92) to the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA) for the management and monitoring of ocean disposal activities, as resources allow, by the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (Corps).

5/30/06	MAY 18 2006
Pete Taylor Date	J. I. Palmer, Date
Colonel, District Commander	Regional Administrator
U.S. Army Corps of Engineers,	U.S. Environmental Protection Agency
Mobile District	Region 4
Mobile, Alabama	Atlanta, Georgia

This plan is effective from the date of signature for a period not to exceed 10 years. The plan shall be reviewed and revised more frequently if site use and conditions at the site indicate a need for revision.

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PASCAGOULA ODMDS

SITE MANAGEMENT AND MONITORING PLAN

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PASCAGOULA ODMDS
SITE MANAGEMENT AND MONITORING PLAN

1.0 <u>INTRODUCTION</u>.

It is the responsibility of the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE) under the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 to manage and monitor each of the Ocean Dredged Material Disposal Sites (ODMDSs) designated by the EPA pursuant to Section 102 of MPRSA. A site management and monitoring plan (SMMP) was originally developed as part of the designation process and was published in July 1991 as part of the *Final Environmental Impact Statement for the Designation of an Ocean Dredged Material Disposal Site Located Offshore Pascagoula, Mississippi* to specifically address the disposal of dredged material into the Pascagoula ODMDS. This plan is currently being revised to incorporate subsequent monitoring results and to comply with provisions of the Water Resources Development Act (WRDA) of 1992. This document serves as a revision to and supercedes the original plan. Upon finalization of this revised SMMP, these SMMP provisions shall be requirements for all dredged material disposal activities at the site. **All Section 103 (MPRSA) ocean disposal permits or evaluations shall be conditioned as necessary to assure consistency with the SMMP.**

This SMMP has been prepared in accordance with the *Guidance Document for Development of Site Management Plans for Ocean Dredged Material Disposal Sites* (EPA and COE 1996). This document provides a framework for the development of SMMPs required by MPRSA and WRDA 92. The SMMP may be modified if it is determined that such changes are warranted as a result of information obtained during the monitoring process. The SMMP will be reviewed and revised as needed or every ten years, whichever time period is shorter.

1.1 <u>Site Management and Monitoring Plan Team</u>. An interagency SMMP team has been established to assist EPA and the Corps in finalizing this SMMP. The team consists of the following agencies and their respective representatives:

Corps, Mobile District
Dr. Susan Rees & Ms. Jenny Jacobson

Jackson State Port Authority
Mr. Allen Moeller

Mississippi Department of Environmental Quality
Mr. Robert Seyfarth

EPA Region 4
Mr. Doug Johnson

National Oceanic and Atmospheric Administration
Mr. Buck Sutter

U.S. Coast Guard
District Commander

Mississippi Department of Marine Resources
Mr. Jan Boyd

Mississippi Secretary of State,
Land Division
Anita German Conner

Other agencies, such as the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (USFWS), and the Minerals Management Service (MMS) will be asked to participate where appropriate. The SMMP team will assist EPA and the Corps in evaluating existing monitoring data, the type of disposal (i.e., operations and maintenance (O&M) vs. new work), the type of material (i.e., sand vs. mud), location of placement within the ODMDS, and quantity of material. The team will assist EPA and Corps on deciding on appropriate monitoring techniques, the level of monitoring, the significance of results and potential management options.

Specific responsibilities of EPA and the Corps, Mobile District are:

EPA: EPA is responsible for designating/dedesignating MPRSA Section 102 ODMDSs, for evaluating environmental effects of disposal of dredged material at these sites and for reviewing and concurring on dredged material suitability determinations.

Corps: The Corps is responsible for evaluating dredged material suitability, issuing MPRSA Section 103 permits, regulating site use, and developing and implementing disposal-monitoring programs.

2.0 SITE MANAGEMENT.

ODMDS management involves a broad range of activities including regulating the schedule of use, the quantity, and the physical/chemical characteristics of dredged materials disposed of at the site. It also involves establishing disposal controls, conditions and requirements to avoid and minimize potential impacts to the marine environment. Finally, ODMDS management involves monitoring the site environs to verify that unanticipated or significant adverse effects are not occurring from past or continued use of the site and that permit conditions are met.

Section 228.3 of the Ocean Dumping Regulations (40 CFR 220 - 229) states that "management of a site consists of regulating times, rates, and methods of disposal and quantities and types of materials disposed of; developing and maintaining effective ambient monitoring programs for the site; conducting disposal site evaluation studies; and recommending modifications in site use and/or designation." The plan may be modified if it is determined that such changes are warranted as a result of information obtained through the monitoring process. MPRSA, as amended by WRDA 92, provides that the SMMP shall include but not be limited to:

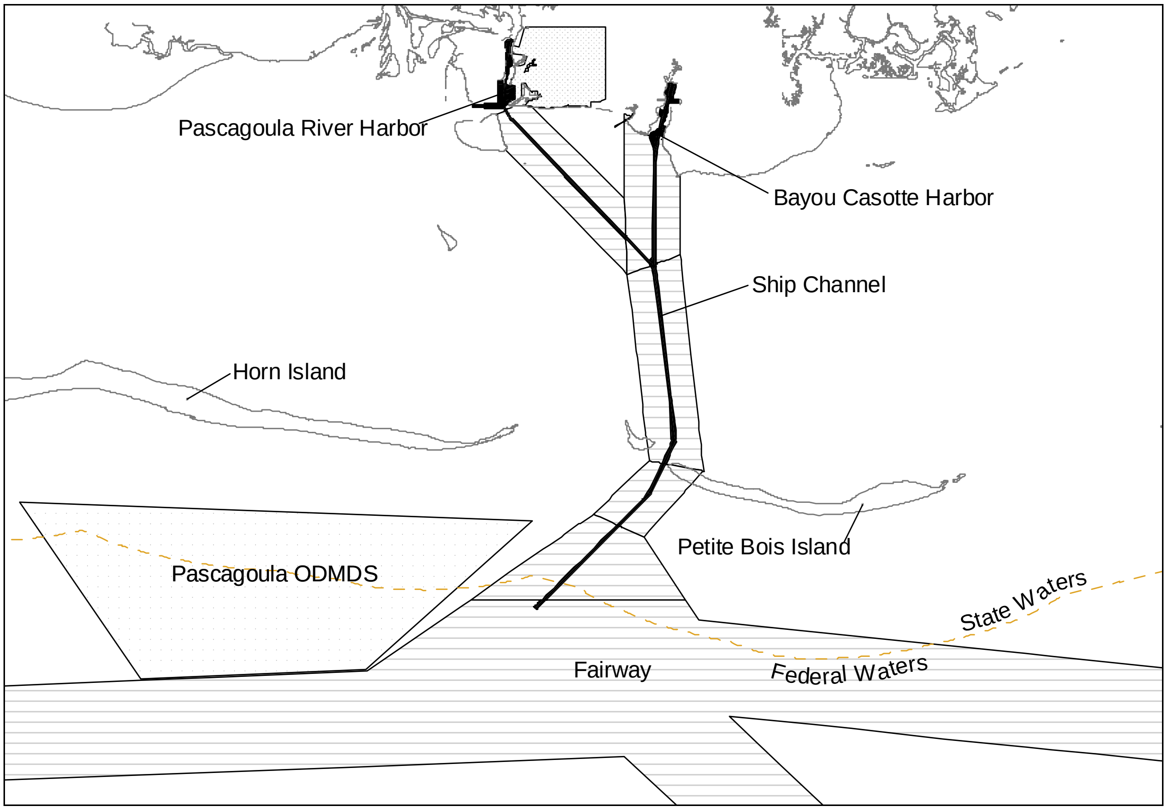
- A baseline assessment of conditions at the site;
- A program for monitoring the site;
- Special management conditions or practices to be implemented at each site that are necessary for the protection of the environment;
- Consideration of the quantity and physical/chemical characteristics of dredged materials to be disposed of at the site;
- Consideration of the anticipated use of the site over the long-term; and
- A schedule for review and revision of the plan.

2.1 Disposal Site Characteristics. The Pascagoula ODMDS is located within the area surrounded by Horn Island to the north, the Pascagoula Ship channel to the east, the navigation safety fairway to the south, and a north-south line running through Dog Keys Pass to the west (**Figure 1**). The Pascagoula ODMDS encompasses an area of approximately 18.5 square nautical miles (nmi) ranging in depth from about 38 feet in the north to over 52 feet in the southern section. The center coordinates for the site are 30°10'09"N and 88°39'12"W. The boundary coordinates of the Pascagoula ODMDS are (NAD 27):

30°12’06” N	88°44’30” W
30°11’42” N	88°33’24” W
30°08’30” N	88°37’00” W
30°08’18” N	88°41”54” W

It is intended that the Pascagoula ODMDS will be utilized for maintenance and new work material from the Pascagoula Harbor Federal navigation project, for maintenance material from the channels and turning basin associated with Naval Station Pascagoula, and possibly by private entities, such as the Jackson County Port Authority (JCPA), Northrop Grumman (formerly known as Ingalls Shipbuilding), and Chevron Refinery. Much of this use is projected to occur in the future and therefore the exact nature and quantity of the material, the time of disposal, and the type of equipment to be used are unknown. Physical and biological conditions at the ODMDS are described in the *Final Environmental Impact Statement for the Designation of an Ocean Dredged Material Disposal Site located Offshore Pascagoula, Mississippi* (USEPA, 1991).

Figure 1. Pascagoula ODMDS Location



2.2 Management Objectives. There are three primary objectives in the management of the Pascagoula ODMDS:

- Protection of the marine environment, living resources, and human health and welfare;
- Documentation of disposal activities at the ODMDS and provision of information that is useful in managing the dredged material disposal activities;
- Beneficial use of dredged material whenever practical.

The objective of the SMMP is to provide guidelines in making management decisions necessary to fulfill mandated responsibilities to protect the marine environment as discussed previously. Risk-free decision-making is an impossible goal; however, an appropriate SMMP can narrow the uncertainty. The following sections provide the framework for meeting these objectives.

2.3 Dredged Material Volumes. It is intended that the Pascagoula ODMDS will be used for disposal of dredged material (both maintenance and construction or new work material) form the Pascagoula Harbor and vicinity. The primary user of the ODMDS will be the COE for maintenance of the Pascagoula Harbor Federal Project. In 1985, the Port of Pascagoula Special Management Area (SMA) Plan was prepared to implement a strategy for the management of the port. Included in this plan was a long-term plan for the disposal of dredged material from the maintenance of the Federal project and the JCPA facilities. In 1986, the plan was modified to include the need for ocean disposal of approximately 650,000 cubic yards of maintenance material from the Federally authorized navigation project every other year. The modification was made necessary due to construction of Naval Station Pascagoula at an area previously used for disposal of dredged material.

Also in 1985, the COE completed studies on the improvement of the Federal Deep-Draft Navigation channel at Pascagoula. These studies recommended improvements, which would result in approximately 14 million cubic yards of new work dredged material being transported to the Pascagoula ODMDS in the Gulf of Mexico for disposal. The WRDA 86 authorized these improvements.

In addition, the construction of the access channel and turning basin at Naval Station Pascagoula required the dredging of approximately 1 million cubic yards of material with subsequent maintenance of approximately 250,000 cubic yards every other year. Initially, this material was to be placed in the remaining disposal area on Singing River Island (SRI), the location of the station. However, due to the size and condition of this site, the materials from the Navy channels were not disposed of at SRI but rather at the ODMDS.

Due to the large size of this site (18 square miles) and the projected dredged material volumes (3-8 million cy) over the next 10 years, capacity is not a concern at this time. If volumes exceed projections by more than 25%, capacity will be considered. A small portion of the ODMDS has historically been utilized for placement of dredged material as shown in **Table 1** and **Figure 2**.

Table 1. Dredged material placement at the Pascagoula ODMDS
(NW=New Work; O&M= Operations & Maintenance; cy = cubic yards)

Year	Volume (cy)	Material Type	Project
1992	168,200	O&M: Sand	Navy Channel
1993	1,161,000	O&M: Sand	Civil Works Channel
1995	2,650,000	NW: Silt/Clay	Civil Works Channel
1998	1,600,000	O&M: Silt/Clay	JCPA
1999	414,200	O&M: Sand	Civil Works Channel
2000	7,700,000	NW: Mixture	Civil Works Channel
2001	3,495,000	NW: Silt/Clay	Civil Works Channel
2002	630,000	O&M: Sand	Civil Works Channel
2003	741,000	O&M: Mixture	Civil Works Channel
	559,000	O&M: Mixture	Navy Channel
2004	1,009,000	O&M: Mixture	Civil Works Channel
2005	121,000	O&M: Mixture	Civil Works Channel

Future volumes and rates of disposal, from both Federal and private applicants, are expected to range around 1 million cubic yards per year. Short-term (5-year) projected disposal volumes are shown in **Table 2**. Civil works maintenance projects for Pascagoula Harbor are anticipated to account for approximately 75% of the total volume of material to be disposed at the ODMDS.

Table 2. Projected Volume of Dredged Material Disposed in the Pascagoula ODMDS (5-year estimates)

Year	Type of Action	Source	Volume (yd^3)	Sponsor	Composition
2006	O&M	Civil Works Channel Navy Channel	450,000 225,000	JCPA Navy	Sands Silts/Clays/Sands
2007		None anticipated	na	na	na
2008	O&M	Civil Works Channel Navy Channel	450,000 225,000	JCPA Navy	Sands Silts/Clays/Sands
2009		None anticipated	na	na	na
2010	O&M	Civil Works Channel Navy Channel	450,000 225,000	JCPA Navy	Sand Silts/Clays/Sands

The Pascagoula ODMDS is believed to be a dispersive site, particularly during active hurricane seasons. However, the dispersiveness of the site and consequently the capacity of the ODMDS have yet to be determined. Future monitoring may be incorporated to address this issue, should mounding or effects outside the disposal site boundaries be observed.

2.4 <u>Material Suitability</u>. Maintenance and new work dredged material is expected to be placed at the site. This material will consist of mixtures of silts, clays, and sands in varying percentages. Sediments dredged from navigation channels in the Pascagoula Harbor include an ocean source (sandy, littoral materials), river source (fine-grained sands, silts, and clays derived from easily eroded soils from the upper Pascagoula River basin), and mixtures of both. Shoals occur where specific physical factors promote deposition or movement of sediments. These factors may vary spatially and temporally.

The disposition of any significant quantities of beach compatible sand from future projects will be determined on a project-by-project basis. Utilization of any significant quantities of beach compatible dredged material for beach nourishment is strongly encouraged and supported by the Corps and EPA. The Corps manages dredged material as a natural resource under its Regional Sedimentation Management initiatives. As part of this management tool, the dredging and disposal operations are evaluated based upon the entirety of the coastal system rather than individually. Disposition of non-beach quality sand should be planned to allow the material to be placed so that it will be within or accessible to the sand-sharing system, to the maximum extent practical, and following the provisions of the Clean Water Act.

There is no general restriction regarding the type of material that may be placed at the site. However, the suitability of dredged material for ocean disposal must be verified by the Corps and agreed to (concurred) by EPA prior to disposal. Verification will be valid for three years from the time last verified. Verification will involve the following:

1) A case-specific evaluation against the exclusion criteria (40 CFR 227.13(b));
2) A determination of the necessity for testing including bioassay (toxicity and bioaccumulation) testing for non-excluded material based on the potential for contamination of the sediment since last tested; and
3) Carrying out the testing (where needed) and determining that the non-excluded, tested material is suitable for ocean disposal.

Documentation of verification will be completed prior to use of the site. Documentation will be in the form of a MPRSA Section 103 Evaluation. The Evaluation and any testing will follow the procedures outlined in the *Evaluation of Dredged Material Proposed for Ocean Disposal Testing Manual (*USEPA/USACE, 1991 or most current revision), and the *Regional Implementation Manual (RIM)* (USEPA Region 4/USACE SAD, 1993 or most current revision). Only material determined to be suitable through the verification process by the Corps and EPA will be placed at the Pascagoula ODMDS.

2.5 <u>Timing of Disposal</u>. Between April 1 and November 30 monitoring and precautions necessary to protect sea turtles and Gulf sturgeon, as described in the next paragraph, are required on hopper dredges. Additionally, if new information indicates that endangered or threatened species are being adversely impacted, additional restrictions may be imposed.

2.6 <u>Disposal Techniques</u>. To protect sea turtles and Gulf sturgeon, the NMFS requires monitoring according to guidance outlined in the *Final Regional Biological Opinion for Hopper Dredging of Channels and Sand Mining Areas in the Gulf of Mexico by Galveston, New Orleans, Mobile, and Jacksonville Districts* (NOAA Fisheries, 2003). In addition, standard surveillance and evasive measures to protect sea turtles and marine mammals shall be employed during all disposal operations at the ODMDS.

Due to the predominant current regime in the area, the site is considered to be dispersive, so that erosion and off-site dispersion is expected to occur. Based on the results of the sediment mapping study and current studies, it is desirable to predetermine the disposal methodologies and locations within the ODMDS for disposal of dredged material, at least until sufficient monitoring information has been collected to provide assurance that dispersal does not result in adverse impacts. Since currents tend to be predominantly west-southwest or west-northwest in the proposed area, initial disposal of fine material will be made in the easternmost portions of the selected site, to the extent practical, in order to assure that the material does not migrate offsite.

It also appears, based on geology of the area and analysis of the sediment mapping data, that finer-grained material is more predominant in the central and southernmost portions of the proposed ODMDS. When possible, consideration should also be given to disposal of finer grained-material in this area, with coarser material being disposed in the northern portion of the ODMDS.

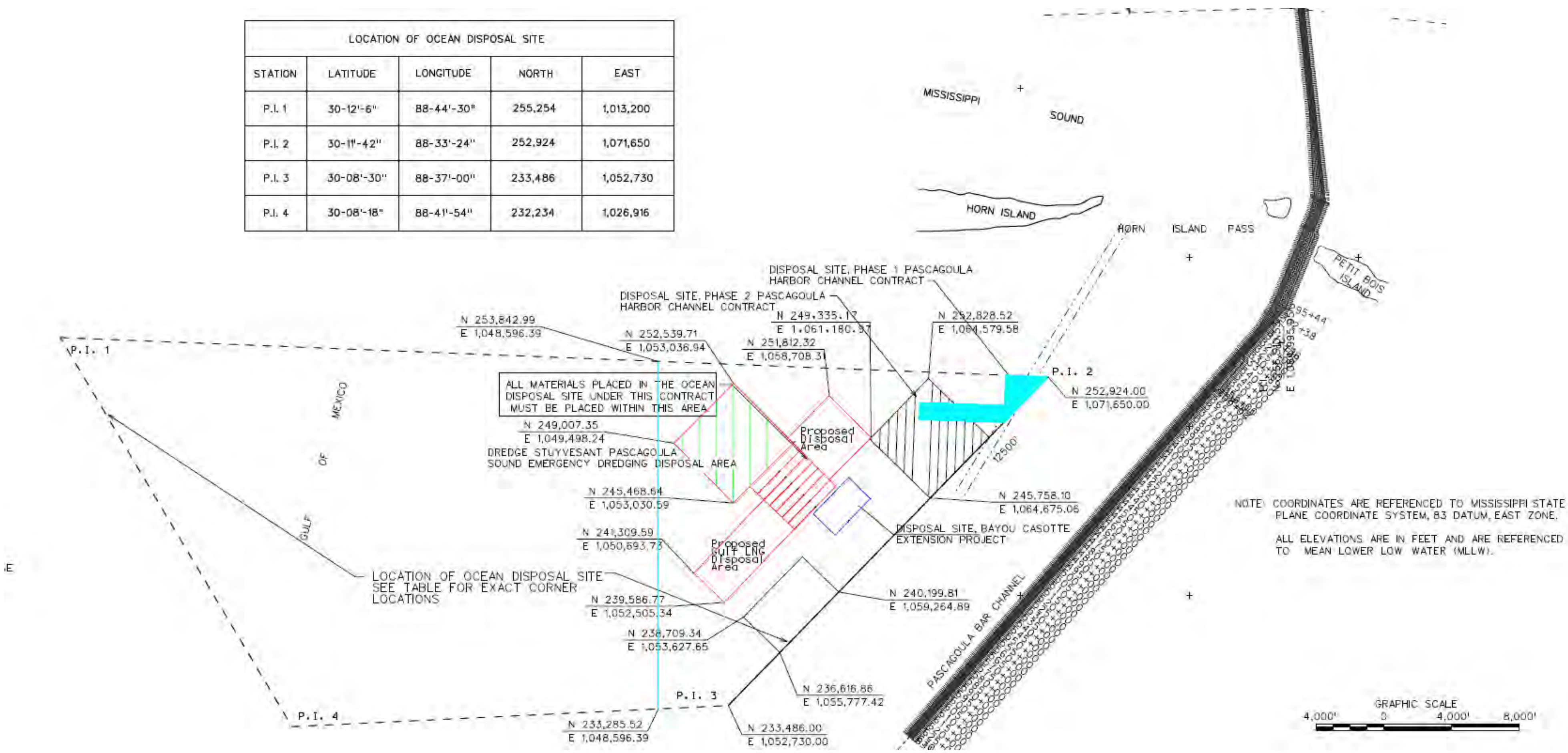
The benefits associated with the construction of a submerged berm, wave energy reduction and habitat creation, were investigated as part of the National Underwater Berm Demonstration Project at Mobile, Alabama. As a result, this type of disposal in the ODMDS proved to be beneficial; therefore, similar management practices are utilized to create relief at the ODMDS in order to increase habitat diversity.

Another submerged structure is included in the Pensacola, FL offshore ODMDS management plan. In this instance the submerged structure is used to control the placement of fine-grained material within the site. A horseshoe shaped, 6-foot high berm is being constructed of sand and a sandy-mud mixture. The berm is open on the western end and fine-grained material will be placed in the eastern mid-section of the horseshoe. The management goal expected to be gained with this plan will be the restriction of movement of the fine-grained materials in the northerly or easterly direction. This goal was developed due to the nature of the resources north and east of the ODMDS. Although no significant resources have been identified in the vicinity of the Pascagoula ODMDS, this technique may prove beneficial if segregation of different types of material within the ODMDS is appropriate.

2.7 Disposal Location. Disposal shall occur no less than 330 feet (100 meters) inside the site boundaries to comply with 40 CFR §227.28. Although mounding is desirable at the Pascagoula ODMDS, placement methods shall prevent mounding of dredged materials from becoming an unacceptable navigation hazard. Dredged material shall be placed so that at no point will depths less than -25 feet mean lower low water (MLLW) occur (i.e., a clearance of 25 feet above the bottom will be maintained). To maximize ODMDS capacity and promote the desired mounding of material, the disposals shall be in specified disposal zones and placed repeatedly at one location; however, at no point shall this mounding obstruct navigation. When necessary, the Corps in consultation with EPA Region 4 will specify zones (**Figure 2**) within the ODMDS for dredged material from each specific ocean disposal activity. Depths at the time of disposal will be monitored to detect if adjustments of disposal methods are needed to prevent unacceptable mounding (navigation hazards). The physical removal or leveling of material above -25 feet MLLW is a management alternative should mounds greater than those elevations occur.

Additionally, while there are currently no active offshore oil and gas lease blocks within the Pascagoula ODMDS boundaries, there could be in the foreseeable future. In the event that a lease block is activated within the ODMDS boundaries, and exploration and/or extraction activities are initiated, all subsequent dredged material disposal zones will be specified so as to maintain a minimum 1,500-foot buffer from oil and gas rigs.

Figure 2. Pascagoula ODMDS Disposal Zones Map



LOCATION OF OCEAN DISPOSAL SITE				
STATION	LATITUDE	LONGITUDE	NORTH	EAST
P.I. 1	30-12'-6"	88-44'-30"	255,254	1,013,200
P.I. 2	30-11'-42"	88-33'-24"	252,924	1,071,650
P.I. 3	30-08'-30"	88-37'-00"	233,486	1,052,730
P.I. 4	30-08'-18"	88-41'-54"	232,234	1,026,916

2.8 <u>Permit and Contract Conditions</u>. The Pascagoula ODMDS is intended for use by a number of entities including the Corps, U.S. Navy, JCPA, Northrup Grumman, Chevron Refinery, etc. Each of these users will have different needs relative to quantity, type of material, timing, etc.; therefore partitioning of the site for specific users may be an appropriate management technique. This could facilitate monitoring and surveillance of individual disposal activities; however, it may not be the most appropriate management technique if beneficial results are desired as previously described.

The disposal monitoring and post-disposal monitoring requirements described under Site Monitoring will be included as permit conditions on all MPRSA Section 103 permits and will be incorporated in the contract language for all Federal projects. A summary of the management and monitoring requirements to be included are listed in **Table 3**. Appendix B contains a template for standard permit conditions for MPRSA 103 permits for the Canaveral ODMDS and Appendix C contains a template for standard contract conditions for civil works project use of the ODMDS.

Table 3. Summary of Permit and Contract Conditions

Condition	Reference
Dredged Material Suitability and Term of Verification	Pascagoula ODMDS SMMP Section 2.4
Disposal within Appropriate Zones	Pascagoula ODMDS SMMP Section 2.7
Disposal Monitoring and Recording of Disposal Locations	Pascagoula ODMDS SMMP Section 3.2
Post Bathymetric Surveys within 30 days of Project Completion	Pascagoula ODMDS SMMP Section 3.3
Reporting Requirements: Daily & Monthly Operations Reports and Disposal Summary Reports within 90 Days of Project Completion	Pascagoula ODMDS SMMP Section 3.5

2.9 <u>Permit Process</u>. The permit process is outlined in **Figure 3** and consists of 10 main steps:

- **Pre-application Consultation**: Includes discussion of alternatives and the qualitative and quantitative information required by the District Engineer for use in evaluating the proposed dredged material.
- **Evaluation of Dredged Material Proposed for Ocean Disposal**: Includes development, approval, and implementation of sampling and analysis plan (see Section on Material Suitability). This step should include close coordination between EPA Region 4, the Corps, Mobile District, and the applicant.

- **Permit Application**: According to 33 CFR 325.1, a permit application must include the following:
    - ❖ A complete description of the proposed activity, including necessary drawings, sketches, or plans
    - ❖ The location, purpose, and need for the proposed activity; scheduling of the activity; names and addresses of adjoining property owners; location and dimension of adjacent structures
    - ❖ A list of authorizations required by other Federal, interstate, State, or local agencies for the work, including all approvals received or denials already made
    - ❖ The source of the material; the purpose of the disposal and a description of the type, composition, and quantity of the material (this includes information necessary to determine if the material is in compliance with the criteria); the method of transportation and disposal of the material; and the location of the disposal site.
- **Review of Application for Completeness**: Additional information is requested if the application is incomplete.
- **Public Notice**: Per 33 CFR 325.3, Public Notices issued by the Corps for dredged material disposal must include all of the information in 40 CFR 225.2(a) (see RIM). A supplemental, revised or corrected Public Notice will be issued if the District Engineer believes that the new information affects the review of the proposal.
- **EPA MPRSA Review**: Independent review of the information to determine whether the disposal activity complies with the criteria found in 40 CFR 227 and 228.
- **District Engineer Completes Evaluation**: The District Engineer addresses comments and holds public meeting if needed.
- **Corps Public Interest Review**: The Corps must consider all comments, suggestions, and concerns provided by all commenters and incorporate their comments into the administrative record of the application.
- **Permit Issued**: A decision to issue or deny a permit is discussed in either a Statement of Findings or Record of Decision.
- **Permit Public Notice**: A list of permit decisions is published and distributed to all interested parties each month

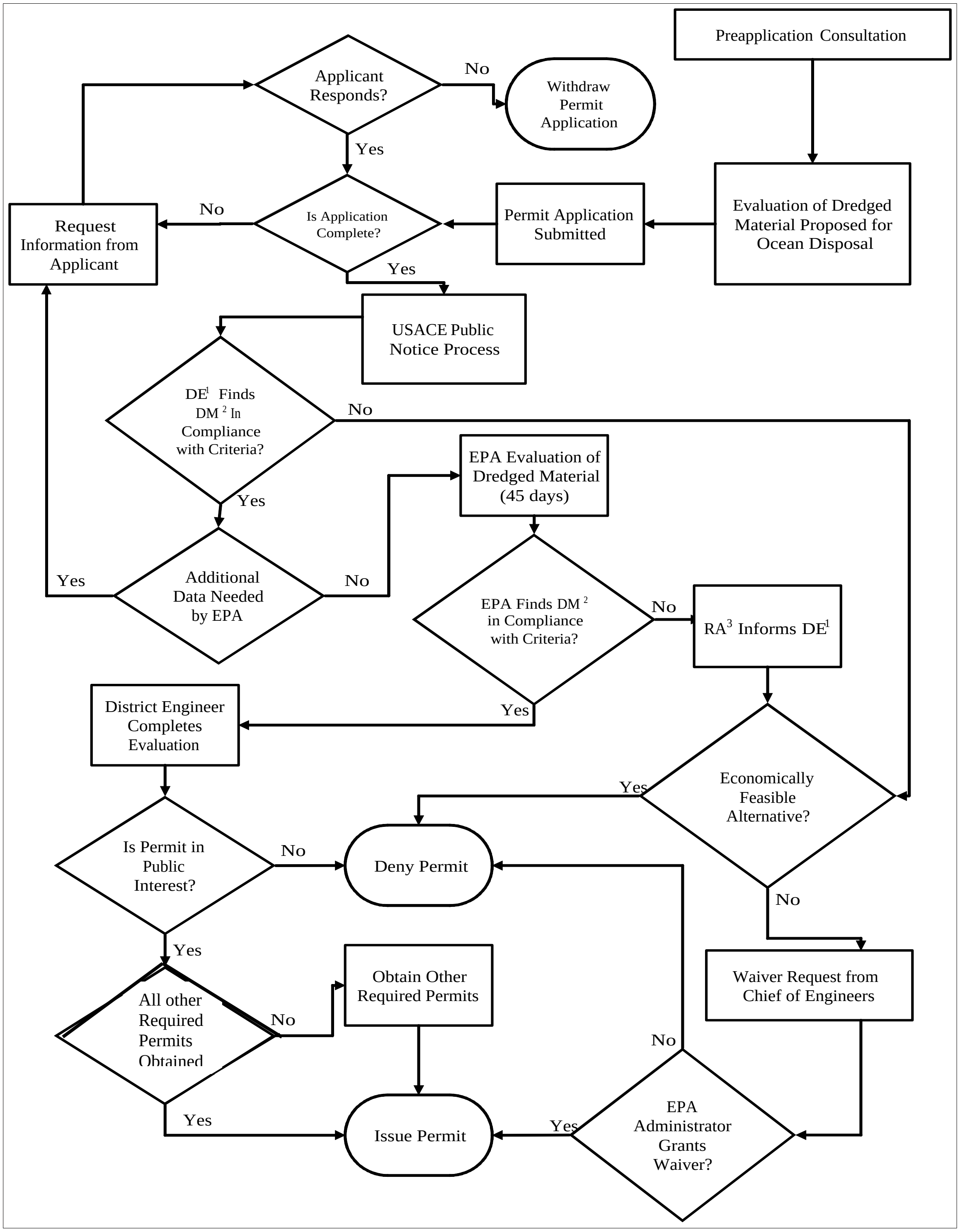


Figure 3: Permit Application/Evaluation Procedure
1-District Engineer; 2-Dredged Material, 3-Regional Administrator

2.10 <u>Information Management of Dredged Material Placement Activities</u>. As discussed in the following sections, a substantial amount of diverse data regarding use of the Pascagoula ODMDS and the effects of disposal is required from many sources (EPA, Corps, Navy, JCPA). If this information is readily available and in a useable format it can be used to answer many questions typically asked about a disposal site:

- What is being dredged?
- How much is being dredged?
- Where did the dredged material come from?
- Where was the dredged material placed?
- Was dredged material dredged correctly? placed correctly?
- What will happen to the environment at the disposal site?

As part of site management, EPA and the Corps will continue to investigate alternatives for appropriate data management. The Corps' GIS database incorporated the earlier Dredged Material Spatial Management Analysis and Record Tool (DMSMART) data management system. GIS enables the Corps and EPA to better manage the Pascagoula ODMDS by incorporating dredging project history and disposal site monitoring data. The Corps uses Silent Inspector to monitor dredging projects with some of this data being transmitted in real-time to the GIS database and EPA. This enables the Corps and EPA to account for multiple users of the site. In addition, the Engineering Research and Development Center (ERDC) compiles the Corps' Ocean Disposal Site Database. This database provides information on all of the ODMDSs in the United States with appropriate chemical, biological, and physical parameters of the proposed dredged material.

3.0 SITE MONITORING.

The MPRSA establishes the need for including a monitoring program as part of the Site Management Plan. Site monitoring is conducted to ensure the environmental integrity of a disposal site and the areas surrounding the site are environmentally unharmed and to verify compliance with the site designation criteria, any special management conditions, and with permit requirements. Monitoring programs should be flexible, cost effective, and based on scientifically sound procedures and methods to meet site-specific monitoring needs. A monitoring program should have the ability to detect environmental change as a result of disposal activities and assist in determining regulatory and permit compliance. The intent of the program is to provide the following:

(1) Information indicating whether the disposal activities are occurring in compliance with the permit and site restrictions; and/or
(2) Information concerning the short-term and long-term environmental impacts of the disposal; and/or
(3) Information indicating the short-term and long-term fate of materials disposed of in the marine environment.

The main purpose of a disposal site monitoring program is to determine whether the dredged material site management practices, including disposal operations, at the site need to be changed to avoid significant adverse impacts.

3.1 Baseline Monitoring. The Pascagoula ODMDS was designated in 1991. Biological, chemical, and physical studies of the Pascagoula ODMDS were conducted during the designation process. The results of investigations presented in the designation EIS and subsequent surveys listed in Table 4 will serve as the main body of data for the monitoring of the impacts associated with the use of the Pascagoula ODMDS.

Table 4. Surveys and Studies Conducted at the Pascagoula ODMDS

Survey/Study Title	Conducted By:	Date	Purpose	Results
Analysis & Synthesis of Oceanic Conditions in the Mississippi Sound Offshore Region	Corps	March 1984	Determine the direction and amount of sediment transport from a dredged material disposal site.	Circulation patterns within the site are controlled by astronomical tides, winds, and freshwater discharges.
Field Survey of the Pascagoula ODMDS (*Analysis & Synthesis of Oceanic Conditions in the Mississippi Sound Offshore Region*)	Corps	March 1984	Video, Bathymetry, Hydrography, Water Quality, Sediment Benthic Survey, Tissue Analysis	-Baseline Survey
Sediment Mapping	UGA Center for Applied Isotopes for EPA	1987	Characterization of bottom sediments using continuous sediment sampling system	- Baseline Survey
Pascagoula ODMDS Benthic Communities Study	Corps	July 1991	Benthic community characterization	- Baseline analysis
Bathymetric Surveys	Corp		Monitor bathymetry changes	- Database
Post Disposal Sediment Mapping at the Pascagoula ODMDS	EPA/UGA Center for Applied Isotope Studies	1999	GIMS/CS3 Chemical Evaluation	- Database
Benthic Community Assessment	EPA	1999	Benthic community characterization	- Database - no significant changes observed
Sediment Quality Assessment for Lead	EPA	2001	Characterize Lead concentrations in ODMDS	- Database, Lead concentrations below 30 mg/kg
Western Area Sediment Characterization	EPA	2003	Physical/Chemical Characterization of Sediments in Western half of ODMDS	- Baseline Survey - no anomalies observed
Disposal Monitoring	Corps	During Each Event	-Compliance	- Database

3.2 <u>Disposal Monitoring</u>. For all disposal activities, the dredging contractor will be required to prepare and operate under an approved electronic verification plan for all disposal operations. As part of this plan, the contractor will provide an automated system that will continuously track (1 to 5 minute intervals) the horizontal location and draft condition (vertical) of the disposal vessel from the point of dredging to the disposal area, and return to the point of dredging. Required digital data are as follows:

(a) Date;
(b) Time;
(c) Vessel Name;
(d) Dump Number;
(e) Map Number on which dump is plotted (if appropriate);
(f) Beginning and ending coordinates of the dredging area for each load (source of dredged material);
(g) Actual location (in degrees and minutes of longitude and latitude) at points of initiation and completion of disposal event;
(h) Brief description of material disposed;
(i) Volume of material disposed; and
(j) Disposal technique used.

The user will be required to prepare and submit to the Corps daily reports of operations and a monthly report of operations for each month or partial month's work. The user is also required to notify the Corps and the EPA if a violation of the permit and/or contract conditions occur during disposal operations. In the case of large new work projects (>1 million cubic yards) where the material is expected to consist of stiff clays, it is recommended that mid-project bathymetric surveys be conducted of the disposal area to insure that mounding limits are not being exceeded.

3.3 <u>Post Discharge Monitoring</u>. The Corps or other site users will conduct a bathymetric survey within 30 days after disposal project completion. [Surveys will not be required for projects less than 50,000 cubic yards.] Surveys will conform to the minimum performance standards for COE hydrographic surveys for navigation and dredging support surveys- soft bottom as described in the Corps' Engineering Manual, EM1110-2-1003, *Hydrographic Surveying*, dated 1 January 2002 to the extent practicable. The number and length of transects required will be sufficient to encompass the area of the Pascagoula ODMDS currently being used (see Figure 2, eastern half of ODMDS) and a 500-foot wide area around the site. The survey area may be reduced on a case-by-case basis if disposal zones are specified and adhered to. The surveys will be taken along lines spaced at 200-foot intervals or less with a depth recording density of 20 to 70 feet. Depth precision of the surveys will be +/- 0.1 feet. Horizontal location of the survey lines and depth sounding points will be determined by an automated positioning system utilizing either a microwave line of site system or differential global positioning system. Under ordinary conditions mean tidal range is 1.75 feet, and extreme range is 3.75 feet. Plane of reference is mean low water. The horizontal datum will be Mississippi State Plane (zone 2301 MS East) or Geographic (NAD 1983). Bathymetric surveys will be used to monitor the disposal mound to insure a navigation hazard is not produced, to assist in verification of material placement, to monitor bathymetric changes and trends, to aid in environmental effects monitoring, and to insure that the site capacity is not exceeded, i.e., the mound does not exceed the site boundaries. Copies of these surveys shall be provided to EPA Region 4 when completed as part of the summary report (see Section 3.5).

3.4 <u>Material Tracking and Disposal Effects Monitoring</u>. Surveys can be used to address possible changes in bathymetric, physical, chemical, and biological aspects of the Pascagoula ODMDS and surrounding area as a result of the disposal of dredged material at the site.

3.4.1 <u>Summary of Results of Past Monitoring Surveys</u>. The *Final Environmental Impact Statement for the Designation of an Ocean Dredged Material Disposal Site located Offshore Pascagoula, Mississippi* and **Table 4** provide the past surveys at the Pascagoula ODMDS. The results of investigations presented in the EIS, and subsequent surveys will serve as the main body of baseline data for the monitoring of the impacts associated with the use of the Pascagoula ODMDS. This baseline data includes the following surveys: benthic macroinvertebrates, fisheries, water and sediment chemistry, sediment mapping, physical oceanographic conditions, and bathymetry. No adverse impacts to benthic infauna within the ODMDS or surrounding area have been observed.

3.4.2 <u>Future Monitoring Surveys</u>. Based on the type and volume of material disposed and impacts of concern, various monitoring surveys can be used to examine if (and the direction) the disposed dredged material is moving, and what environmental effect the material is having on the site and adjacent areas. A tiered approach will be utilized to determine the level of monitoring effort required following each disposal event. At a minimum bathymetry will follow all disposal events. Bathymetric surveys will be the responsibility of the dredged material generator while EPA and/or Corps will be responsible for status and trends activities.

Within 30 days of completion of a disposal event, detailed bathymetric surveys of the placement area will be completed. Sediment mapping of the placement (disposal zone) and adjacent areas may be required. The interagency team will meet to review the results of these efforts and determine the need for additional information. This need will be based on observance of any anomalies or potential adverse impacts associated with a specific disposal event. If the results of the bathymetric and/or sediment mapping surveys do not indicate any anomalies or adverse impacts no additional monitoring will be required for the disposal event. Reassessment of the site may be undertaken, possibly every 10 years. At a minimum, this reassessment will include benthic macroinfaunal and sediment chemistry surveys. Additional surveys for water quality, sediment mapping, or the use of remote sensing equipment may also be required.

At the current time, no nearby biological resources have been identified that are of concern for potential impact. The Pascagoula ODMDS is at least one nautical mile from all known fish havens and artificial reefs. The site has been designated as a dispersive site. This means that it is expected that material will be moved outside the site boundaries. It is also expected that this material will not move in distinct mounds, but instead will blend with the surrounding environment causing a progressive transition to sediments containing a higher percentage of silt and clay. Changes in sediment composition will likely alter the benthic community structure. However, based on previous benthic studies, it is unlikely that permanent or long-term adverse impacts will result due to changes in sediment composition.

Future surveys, as outlined in **Table 5,** will focus on determining the rate and direction of disposed dredged material dispersal and the capacity of the ODMDS. Should future disposal at the ODMDS result in unacceptable adverse impacts, further studies may be required to determine the persistence of these impacts, the extent of the impacts within the marine system, and/or possible means of mitigation. In addition, the management plan presented may require revision based on the outcome of any monitoring program.

Table 5. ODMDS Monitoring Strategies and Thresholds for Action

Goal	Technique	Sponsor	Rationale	Frequency	Threshold for Action	Management Options	
						Threshold Not Exceeded	Threshold Exceeded
Monitor Bathymetric Trends	Bathymetry	Site User	Determine the extent of the disposal mound and major bathymetric changes	Post disposal	Disposal mound occurs outside ODMDS boundaries	Continue Monitoring	-Modify disposal method/placement -Restrict disposal volumes -Enlarge site
Site Capacity	Information from Long Term Fate	EPA/ Corps/ Site Users	Determine dispersiveness of site and long and short term capacity	Prior to any project in excess of 10 million cubic yards	New work volumes exceed estimated capacity Maintenance volumes exceed estimated capacity	Continue to use site without restrictions Continue to use site without restrictions	Conduct Site Capacity Study Conduct Site Capacity Study
Insure Safe Navigation Depth	Bathymetry	Site User	Determine height of mound and any excessive mounding	Post disposal	Mound height > -35 feet mean lower low water (MLLW) Mound height > -25 feet MLLW	Continue Monitoring Continue Monitoring	-Modify disposal method/placement -Restrict disposal volumes - Physically level material
Compliance	Disposal Site Use Records S.I. or EPA/COE approved equivalent	Site User	-Insure management requirements are being met -To assist in site monitoring	Daily during the project	Disposal records required by SMMP are not submitted or are incomplete Review of records indicates a dump occurred outside ODMDS boundary Review of records indicates a dump occurred in the ODMDS but not in target area	Continue Monitoring Continue Monitoring Continue Monitoring	-Restrict site use until requirements are met -Notify EPA Region 4/COE, and investigate why egregious dump(s) occurred. Take appropriate enforcement action. - Withhold payment from Contractor -Direct placement to occur as specified.
Benthic Effects Monitoring	Sediment Mapping (Gamma/ CS^3)	EPA	Determine aerial influence of dredged material	Completed	Communities under the influence of dredged material outside the site have significant differences in diversity/ richness/biomass from those not under dredged material influence after one-year recovery period.	Discontinue monitoring unless disposal quantities, type of material or frequency of use significantly changes	-Limit quantity of dredged material to prevent impacts outside boundaries -Create berms to retard dredged material movement -Cease site use
	Benthic Survey	EPA	Determine impact of dredged material on benthic community	Completed			

3.5 Reporting and Data Formatting. The user will be required to prepare daily reports of operations and submit to the Corps a monthly report of operations for each month or partial month's work. Disposal monitoring data shall be delivered to the Corps on a weekly basis. Disposal monitoring reporting shall comply with the minimum requirements as specified in Silent Inspector, or equivalent system approved by EPA and COE. The user is also required to notify the Corps and the EPA within 24 hours if a violation of the permit and/or contract conditions related to MPRSA Section 103 or SMMP requirements occur during disposal operations.

The Corps shall provide disposal summary reports to EPA within 90 days after project completion. These should consist of dates of disposal, volume of disposal, approximate location of disposal and disposal bathymetric survey results in both hard and electronic formats. Other disposal monitoring data shall be made available upon request. In addition, EPA should be notified by the Corps 15 days prior to the beginning of a dredging cycle or project disposal.

Material tracking, disposal effects monitoring, and any other data collected shall be coordinated with and be provided to SMMP team members and Federal and State agencies as appropriate. Data will be provided to other interested parties requesting such data to the extent possible. Data will be provided for all surveys in a report generated by the action agency. The report should indicate how the survey relates to the SMMP and previous surveys at the Pascagoula ODMDS and should provide data interpretations, conclusions, and recommendations, and should project the next phase of the SMMP.

4.0 ANTICIPATED SITE USE.

It is anticipated that there will be a need for use of the Pascagoula ODMDS for many years. The anticipated site will be utilized to dispose of an excess of 1 million cubic yards of dredged material per year. This projection is based on past dredging records, currently available dredged material disposal options, and the Corps' planning documents. The estimate likely represents the high end of the potential range of quantities, as efforts are underway to develop alternative dredged material disposal methods, particularly for mid-river areas, i.e. the Pascagoula River Harbor Dredged Material Management Plan.

5.0 MODIFICATION OF THE PASCAGOULA ODMDS SMMP.

Should the results of the monitoring surveys or valid reports from other sources indicate that continued use of the ODMDS would lead to unacceptable effects, then the ODMDS management will be modified to mitigate the adverse effects. The SMMP will be reviewed and updated at least every 10 years. The SMMP will be reviewed and updated as necessary if site use changes significantly. For example, the SMMP will be reviewed if the quantity or type of dredged material placed at site changes significantly or if conditions at the site indicate a need for revision. The plan should be updated in conjunction with activities authorizing use of the site.

6.0 IMPLEMENTATION OF THE PASCAGOULA ODMDS SMMP.

This plan shall be effective from date of signature for a period not to exceed 10 years. The EPA and the Corps shall share responsibility for implementation of the SMMP. Site users may be required to undertake monitoring activities as a condition of their permit. The Corps will be responsible for implementation of the SMMP for Federal maintenance projects.

7.0 <u>REFERENCES.</u>

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U.S. Environmental Protection Agency Region 4 and U.S. Army Corps of Engineers South Atlantic Division, 1993. *Regional Implementation Manual Requirements and Procedures for Evaluation of the Ocean Disposal of Dredged Material in Southeastern Atlantic and Gulf Coastal Waters,* May 1993.

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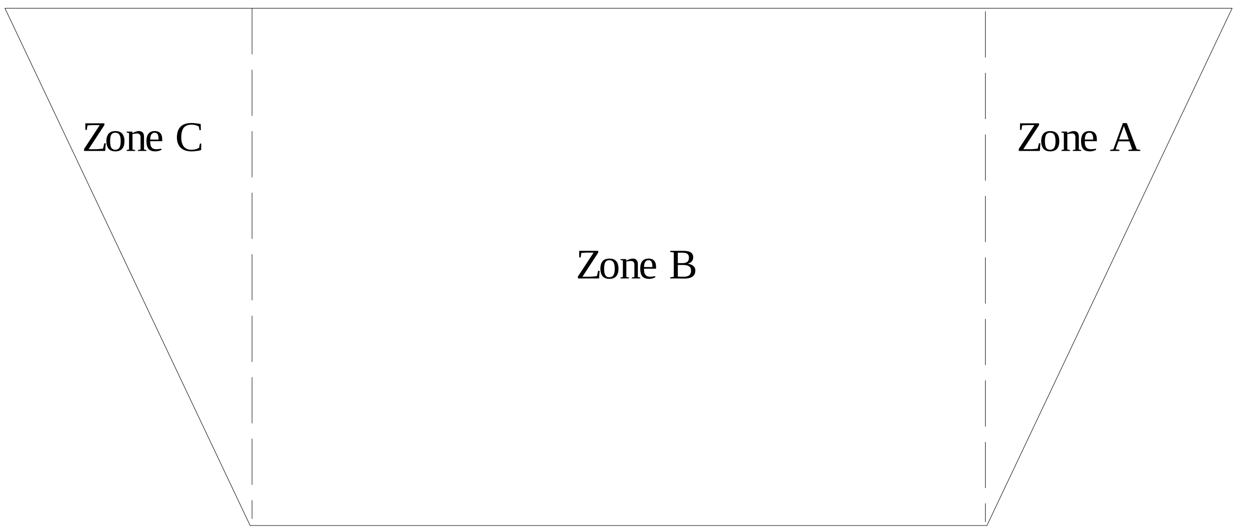
U.S. Environmental Protection Agency Region 4, 1991. *Final Environmental Impact Statement for the Designation of an Ocean Dredged Material Disposal Site located Offshore Pascagoula, Mississippi*.

APPENDIX A

WATER COLUMN EVALUATIONS
NUMERICAL MODEL (STFATE) INPUT PARAMETERS

Pascagoula ODMDS
STFATE Modeling Zones



Water Column Evaluations
Numerical Model (STFATE) Input Parameters
Pascagoula ODMDS Zone A

SITE DESCRIPTION

Parameter	Value	Units
Number of Grid Points (left to right)	45	
Number of Grid Points (top to bottom)	45	
Spacing Between Grid Points (left to right)	500	ft
Spacing Between Grid Points (top to bottom)	500	ft
Constant Water Depth	44	ft
Roughness Height at Bottom of Disposal Site	.005[1]	ft
Slope of Bottom in X-Direction	0	Deg.
Slope of Bottom in Z-Direction	0	Deg.
Number of Points in Ambient Density Profile Point	2	
Ambient Density at Depth = 5 ft	1.0174	g/cc
Ambient Density at Depth = 44 ft	1.0230	g/cc

AMBIENT VELOCITY DATA

Parameter	Value	Units
Profile	2-Point at constant depth	
X-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
Z-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
X-Direction Velocity at Depth = 40 ft	-0.116	ft/sec
Z-Direction Velocity at Depth = 40 ft	+0.116	ft/sec

DISPOSAL OPERATION DATA

Parameter	Value	Units
Location of Disposal Point from Top of Grid	8,500[2]	ft
Location of Disposal Point from Left Edge of Grid	8,200[2]	ft
Dumping Over Depression	0	

INPUT, EXECUTION AND OUTPUT

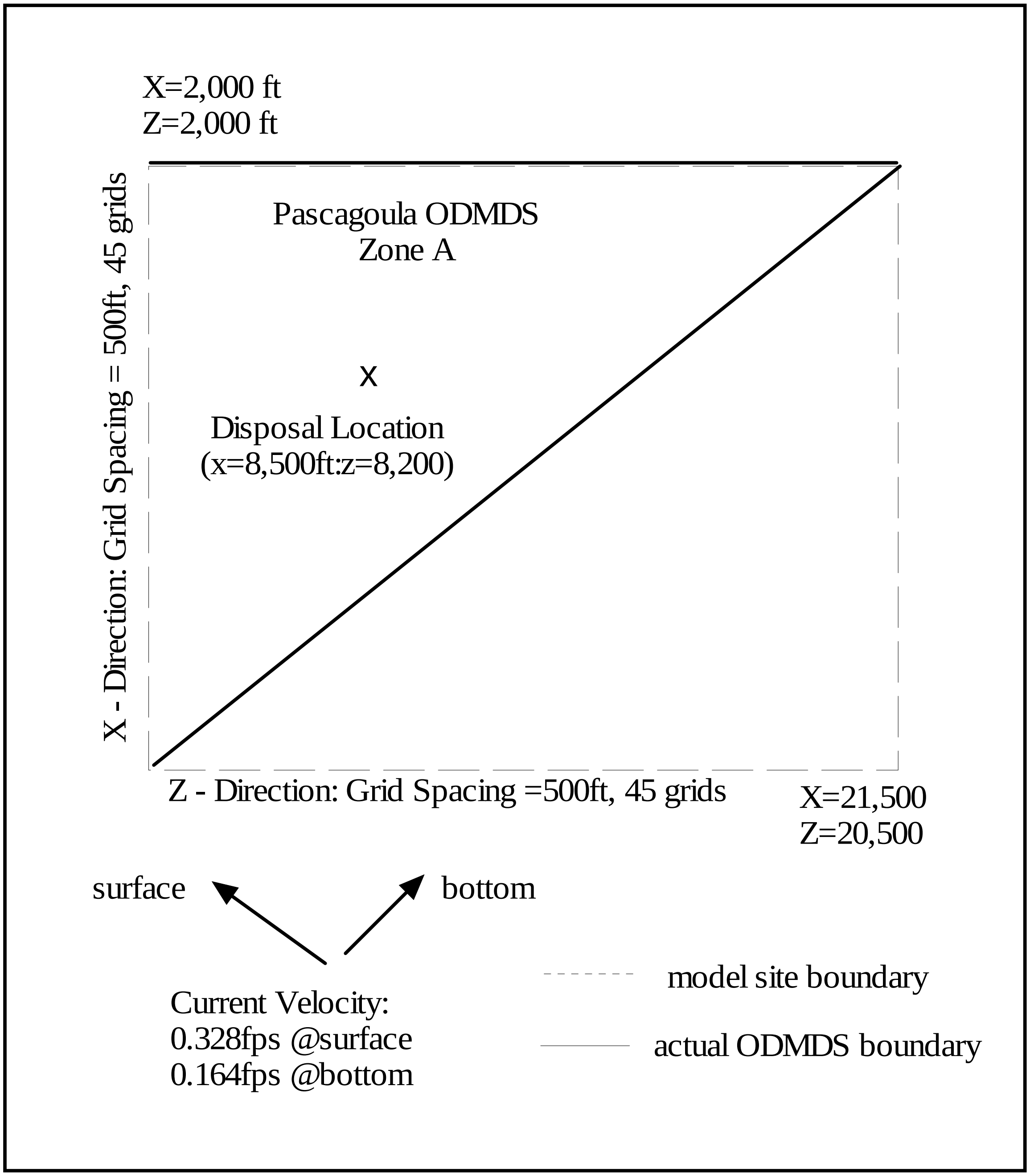
Parameter	Value	Units
Location of the Upper Left Corner of the Disposal Site - Distance from Top Edge	2,000	ft
Location of the Upper Left Corner of the Disposal Site - Distance from Left Edge	2,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Top Edge	21,500	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Left Edge	20,500	ft
Duration of Simulation	14,400	sec
Long Term Time Step	600	sec

COEFFICIENTS

Parameter	Keyword	Value
Settling Coefficient	BETA	0.000[1]
Apparent Mass Coefficient	CM	1.000[1]
Drag Coefficient	CD	0.500[1]
Form Drag for Collapsing Cloud	CDRAG	1.000[1]
Skin Friction for Collapsing Cloud	CFRIC	0.010[1]
Drag for an Ellipsoidal Wedge	CD3	0.100[1]
Drag for a Plate	CD4	1.000[1]
Friction Between Cloud and Bottom	FRICTN	0.010[1]
4/3 Law Horizontal Diffusion Dissipation Factor	ALAMDA	0.001[1]
Unstratified Water Vertical Diffusion Coefficient	AKYO	Pritchard Expression
Cloud/Ambient Density Gradient Ratio	GAMA	0.250[1]
Turbulent Thermal Entrainment	ALPHAO	0.235[1]
Entrainment in Collapse	ALPHAC	0.100[1]
Stripping Factor	CSTRIP	0.003[1]

[1]Model default value
[2]Represents center of zone A. Dredged material requiring disposal in another location in order to meet the dilution criteria must be brought to the attention of EPA and the COE.

Typical dilution achieved after 4 hours = 500:1
Plume does not reach site boundaries within 4 hours


X=2,000 ft
Z=2,000 ft
Pascagoula ODMDS
Zone A
x
Disposal Location
(x=8,500ft:z=8,200)
X - Direction: Grid Spacing = 500ft, 45 grids
Z - Direction: Grid Spacing =500ft, 45 grids
X=21,500
Z=20,500
surface
bottom
Current Velocity:
0.328fps @surface
0.164fps @bottom
model site boundary
actual ODMDS boundary

Water Column Evaluations
Numerical Model (STFATE) Input Parameters
Pascagoula ODMDS Zone B

SITE DESCRIPTION

Parameter	Value	Units
Number of Grid Points (left to right)	45	
Number of Grid Points (top to bottom)	45	
Spacing Between Grid Points (left to right)	600	ft
Spacing Between Grid Points (top to bottom)	600	ft
Constant Water Depth	46	ft
Roughness Height at Bottom of Disposal Site	.005[1]	ft
Slope of Bottom in X-Direction	0	Deg.
Slope of Bottom in Z-Direction	0	Deg.
Number of Points in Ambient Density Profile Point	2	
Ambient Density at Depth = 5 ft	1.0174	g/cc
Ambient Density at Depth = 46 ft	1.0230	g/cc

AMBIENT VELOCITY DATA

Parameter	Value	Units
Profile	2-Point at constant depth	
X-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
Z-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
X-Direction Velocity at Depth = 40 ft	-0.116	ft/sec
Z-Direction Velocity at Depth = 40 ft	+0.116	ft/sec

DISPOSAL OPERATION DATA

Parameter	Value	Units
Location of Disposal Point from Top of Grid	13,500[2]	ft
Location of Disposal Point from Left Edge of Grid	14,500[2]	ft
Dumping Over Depression	0	

INPUT, EXECUTION AND OUTPUT

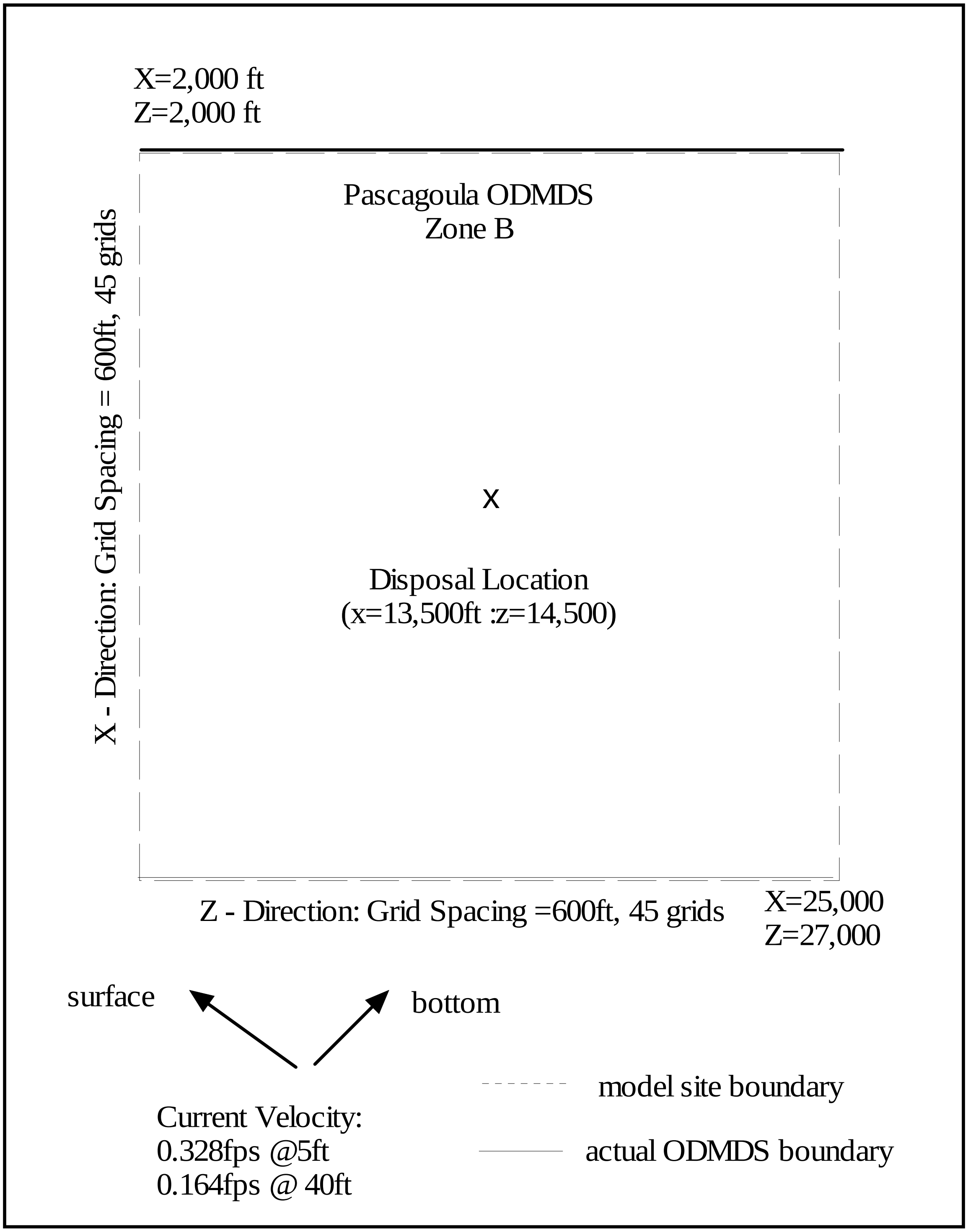
Parameter	Value	Units
Location of the Upper Left Corner of the Disposal Site - Distance from Top Edge	2,000	ft
Location of the Upper Left Corner of the Disposal Site - Distance from Left Edge	2,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Top Edge	25,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Left Edge	27,000	ft
Duration of Simulation	14,400	sec
Long Term Time Step	600	sec

COEFFICIENTS

Parameter	Keyword	Value
Settling Coefficient	BETA	0.000[1]
Apparent Mass Coefficient	CM	1.000[1]
Drag Coefficient	CD	0.500[1]
Form Drag for Collapsing Cloud	CDRAG	1.000[1]
Skin Friction for Collapsing Cloud	CFRIC	0.010[1]
Drag for an Ellipsoidal Wedge	CD3	0.100[1]
Drag for a Plate	CD4	1.000[1]
Friction Between Cloud and Bottom	FRICTN	0.010[1]
4/3 Law Horizontal Diffusion Dissipation Factor	ALAMDA	0.001[1]
Unstratified Water Vertical Diffusion Coefficient	AKYO	Pritchard Expression
Cloud/Ambient Density Gradient Ratio	GAMA	0.250[1]
Turbulent Thermal Entrainment	ALPHAO	0.235[1]
Entrainment in Collapse	ALPHAC	0.100[1]
Stripping Factor	CSTRIP	0.003[1]

[1]Model default value
[2]Represents center of zone A. Dredged material requiring disposal in another location in order to meet the dilution criteria must be brought to the attention of EPA and the COE.

Typical dilution achieved after 4 hours = 500:1
Plume does not reach site boundaries within 4 hours


X=2,000 ft
Z=2,000 ft
Pascagoula ODMDS
Zone B
X - Direction: Grid Spacing = 600ft, 45 grids
x
Disposal Location
(x=13,500ft :z=14,500)
Z - Direction: Grid Spacing =600ft, 45 grids
X=25,000
Z=27,000
surface
bottom
Current Velocity:
0.328fps @5ft
0.164fps @ 40ft
model site boundary
actual ODMDS boundary

Water Column Evaluations
Numerical Model (STFATE) Input Parameters
Pascagoula ODMDS Zone C

SITE DESCRIPTION

Parameter	Value	Units
Number of Grid Points (left to right)	45	
Number of Grid Points (top to bottom)	45	
Spacing Between Grid Points (left to right)	400	ft
Spacing Between Grid Points (top to bottom)	600	ft
Constant Water Depth	47	ft
Roughness Height at Bottom of Disposal Site	.005[1]	ft
Slope of Bottom in X-Direction	0	Deg.
Slope of Bottom in Z-Direction	0	Deg.
Number of Points in Ambient Density Profile Point	2	
Ambient Density at Depth = 5 ft	1.0174	g/cc
Ambient Density at Depth = 47 ft	1.0230	g/cc

AMBIENT VELOCITY DATA

Parameter	Value	Units
Profile	2-Point at constant depth	
X-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
Z-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
X-Direction Velocity at Depth = 40 ft	-0.116	ft/sec
Z-Direction Velocity at Depth = 40 ft	+0.116	ft/sec

DISPOSAL OPERATION DATA

Parameter	Value	Units
Location of Disposal Point from Top of Grid	9,660[2]	ft
Location of Disposal Point from Left Edge of Grid	11,200[2]	ft
Dumping Over Depression	0	

INPUT, EXECUTION AND OUTPUT

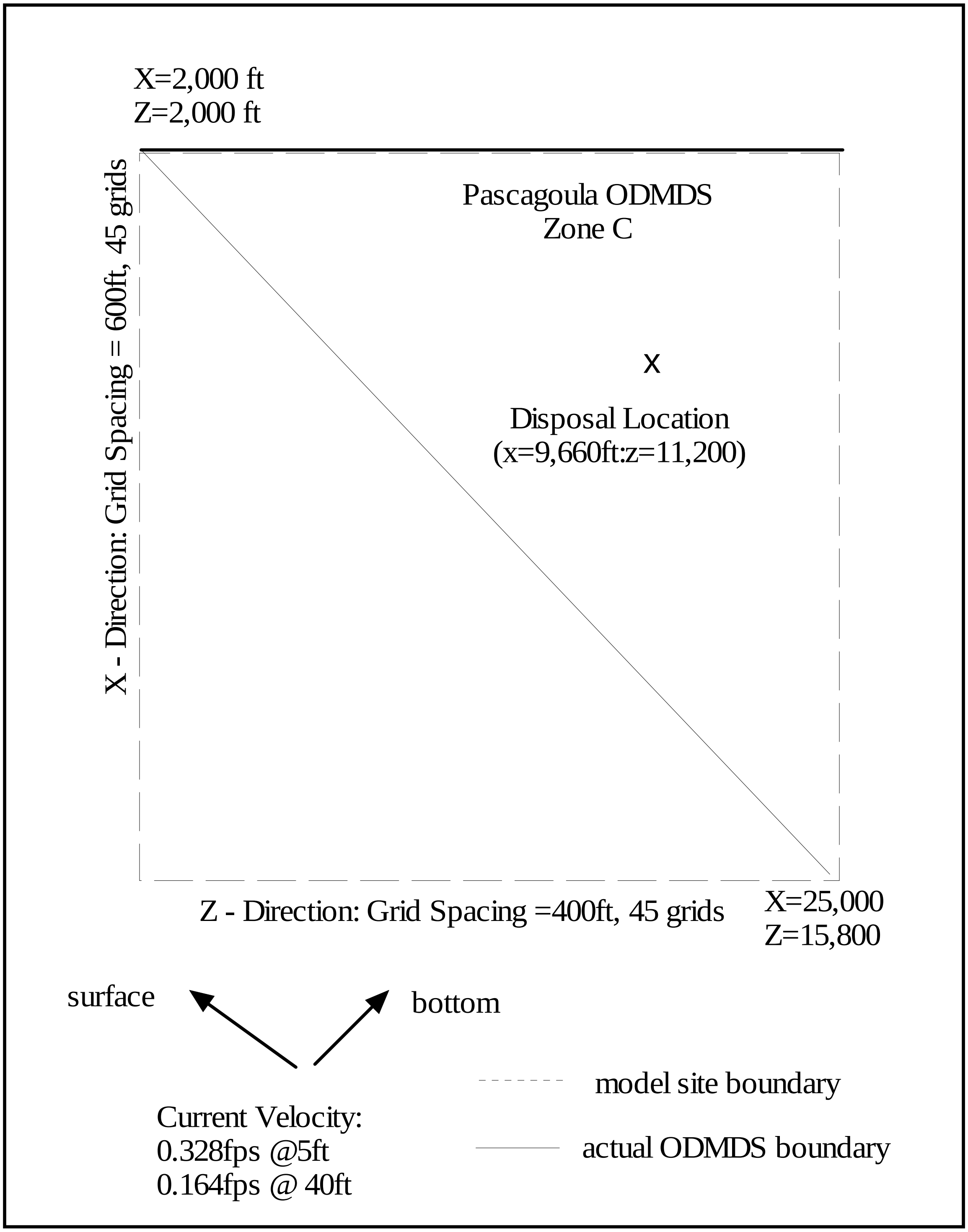
Parameter	Value	Units
Location of the Upper Left Corner of the Disposal Site - Distance from Top Edge	2,000	ft
Location of the Upper Left Corner of the Disposal Site - Distance from Left Edge	2,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Top Edge	25,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Left Edge	15,800	ft
Duration of Simulation	14,400	sec
Long Term Time Step	600	sec

COEFFICIENTS

Parameter	Keyword	Value
Settling Coefficient	BETA	0.000[1]
Apparent Mass Coefficient	CM	1.000[1]
Drag Coefficient	CD	0.500[1]
Form Drag for Collapsing Cloud	CDRAG	1.000[1]
Skin Friction for Collapsing Cloud	CFRIC	0.010[1]
Drag for an Ellipsoidal Wedge	CD3	0.100[1]
Drag for a Plate	CD4	1.000[1]
Friction Between Cloud and Bottom	FRICTN	0.010[1]
4/3 Law Horizontal Diffusion Dissipation Factor	ALAMDA	0.001[1]
Unstratified Water Vertical Diffusion Coefficient	AKYO	Pritchard Expression
Cloud/Ambient Density Gradient Ratio	GAMA	0.250[1]
Turbulent Thermal Entrainment	ALPHAO	0.235[1]
Entrainment in Collapse	ALPHAC	0.100[1]
Stripping Factor	CSTRIP	0.003[1]

[1]Model default value
[2]Represents center of zone A. Dredged material requiring disposal in another location in order to meet the dilution criteria must be brought to the attention of EPA and the COE.

Typical dilution achieved after 4 hours = 500:1
Plume does not reach site boundaries within 4 hours


X=2,000 ft
Z=2,000 ft
Pascagoula ODMDS
Zone C
X
Disposal Location
(x=9,660ft:z=11,200)
X - Direction: Grid Spacing = 600ft, 45 grids
Z - Direction: Grid Spacing =400ft, 45 grids
X=25,000
Z=15,800
surface
bottom
Current Velocity:
0.328fps @5ft
0.164fps @ 40ft
model site boundary
actual ODMDS boundary

PASCAGOULA ODMDS SMMP
APPENDIX B

TEMPLATE
FOR MPRSA 103
STANDARD PERMIT
CONDITIONS

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TEMPLATE
GENERIC SPECIAL CONDITIONS
FOR MPRSA SECTION 103 PERMITS
Pascagoula, MS ODMDS

I. DISPOSAL OPERATIONS

A. For this permit, the term disposal operations shall mean: navigation of any vessel used in disposal of operations, transportation of dredged material from the dredging site to the Pascagoula ODMDS, proper disposal of dredged material at the disposal area within the Pascagoula ODMDS, and transportation of the hopper dredge or disposal barge or scow back to the dredging site.

B. The Pascagoula ODMDS is defined as the trapezoid with center coordinates of Geo NAD 27: 30 10 09 N 88 29 12 W; Geo NAD 83: 30 10 09.7 N 88 39 12.1 E; and MS State Plane EAST: 243468 N 1041125 E.

The corner coordinates are as follows:

Geo NAD 27	Geo NAD83	MS State Plane East
30 12 06 N 88 44 30 W	30 12 06.7 N 88 44 30.1 E	255254 N 1013200 E
30 11 42 N 88 33 24 W	30 11 42.7 N 88 33 24.1 E	252924 N 1071650 E
30 08 30 N 88 37 00 W	30 08 30.7 N 88 37 00.1 E	233487 N 1052731 E
30 08 18 N 88 41 54 W	30 08 18.7 N 88 41 54.1 E	232235 N 1026917 E

C. No more than [NUMBER] cubic yards of dredged material excavated at the location defined in [REFERENCE LOCATION IN PERMIT] are authorized for disposal at the Pascagoula ODMDS.

D. The permittee shall use an electronic positioning system to navigate to and from the Pascagoula ODMDS. For this section of the permit, the electronic positioning system is defined as: a differential global positioning system or a microwave line of site system. Use of LORAN-C alone is not an acceptable electronic positioning system for disposal operations at the Pascagoula ODMDS. If the electronic positioning system fails or navigation problems are detected, all disposal operations shall cease until the failure or navigation problems are corrected.

E. The permittee shall certify the accuracy of the electronic positioning system proposed for use during disposal operations at the Pascagoula ODMDS. The certification shall be accomplished by direct comparison of the electronic positioning system’s accuracy with a known fixed point.

F. The permittee shall not allow any water or dredged material placed in a hopper dredge or disposal barge or scow to flow over the sides or leak from such vessels during transportation to the Pascagoula ODMDS.

G. A disposal operations inspector and/or captain of any tugboat, hopper dredge or other vessel used to transport dredged material to the Pascagoula, MS ODMDS shall insure compliance with disposal operation conditions defined in this permit.

> 1. If the disposal operations inspector or the captain detects a violation, he shall report the violation to the permittee immediately.
>
> 2. The permittee shall contact the U.S. Army Corps of Engineers, Mobile District's Regulatory Branch [TELEPHONE NUMBER] and EPA Region 4 at (404) 562-9386 to report the violation within twenty-four (24) hours after the violation occurs. A complete written explanation of any permit violation shall be included in the post-dredging report.

H. When dredged material is disposed, no portion of the hopper dredge or disposal barge or scow shall be outside of the boundaries of the Pascagoula ODMDS as defined in Special Condition B. Additionally, disposal shall occur within a specified disposal zone defined as [DEFINE COORDINATES AND SIZE OF DISPOSAL ZONE]. Disposal shall not occur closer than 1,500 feet to any oil and gas rigs that may be present within the site boundaries.

I. The permittee shall use an automated disposal verification system that will continuously track (1 to 5 minute intervals) the horizontal location and draft condition of the disposal vessel (hopper dredge or disposal barge or scow) to and from the Pascagoula ODMDS. This information shall be available in electronic format to the Mobile District Corps of Engineers and EPA Region 4 weekly basis utilizing SI specifications or approved (EPA and COE) requirements.

1. Required digitally recorded data are: date, time, vessel name, captain of vessel, beginning and ending coordinates of the dredging area for each load, location at points of initiation and completion of disposal, description of material disposed (sand, clay or silt), volume of load, and disposal technique. This information will be available to the Mobile District Corps of Engineers on a daily basis.

2. The permittee shall use Mississippi State Plane or latitude and longitude coordinates (North American Datum 1983). State Plane coordinates shall be reported to the nearest 0.10 foot and latitude and longitude coordinates shall be reported as degrees and decimal minutes to the nearest 0.01 minutes.

J. The permittee shall conduct a bathymetric survey of the Pascagoula ODMDS within 30 days following project completion.

1. The number and length of the survey transects shall be sufficient to encompass the defined disposal zone within the Pascagoula ODMDS and a 500 foot wide area around the disposal zone. The transects shall be spaced at 500-foot intervals or less with a depth recording density of 20 to 70 feet.

2. Vertical accuracy of the survey shall be ±0.1 feet. Horizontal location of the survey lines and depth sounding points will be determined by an automated positioning system utilizing either microwave line of site system or differential global positioning system. The vertical datum will be referenced to prescribed NOAA Mean Lower Low Water (MLLW) datum. MLLW is 1.8 feet below NGVD 1929. The horizontal datum will be Mississippi State Plane (zone 2301 MS East) or Geographic (NAD 1983). State Plane coordinates shall be reported to the nearest 0.10 foot and latitude and longitude coordinates shall be reported as degrees and decimal minutes to the nearest 0.01 minutes.

K. The permittee has read and agrees to assure that they are in compliance with the requirements of the Pascagoula ODMDS Site Management and Monitoring Plan.

II. REPORTING REQUIREMENTS

A. The permittee shall send the U.S. Army Corps of Engineers, Mobile District's Regulatory Branch and EPA Region 4' s Wetlands, Coastal and Watersheds Branch (61 Forsyth Street, Atlanta, GA 30303) a notification of commencement of work at least fifteen (15) days before initiation of any dredging operations authorized by this permit.

B. The permittee shall submit to the U.S. Army Corps of Engineers weekly disposal monitoring reports. These reports shall contain the information described in Special Condition I.1.

C. The permittee shall develop and send one (1) copy of the disposal summary report to the Mobile District's Regulatory Branch and one (1) copy of the disposal summary report to EPA Region 4 documenting compliance with all general and special conditions defined in this permit. The disposal summary report shall be sent within 90 days after completion of the disposal operations authorized by this permit. The disposal summary report shall include the following information:

1. The report shall indicate whether all general and special permit conditions were met. Any violations of the permit shall be explained in detail.

2. The disposal summary report shall include the following information: Corps permit number, actual start date and completion date of dredging and disposal operations, total cubic yards disposed at the Pascagoula, MS ODMDS, locations of disposal events, and post disposal bathymetric survey results (in hard and electronic formats).

APPENDIX C

MOBILE DISTRICT CORPS OF ENGINEERS
GENERIC CONTRACT SPECIFICATION LANGUAGE

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Mobile District Corps of Engineers Contract Specification Language

I. Offshore Disposal

A. Dredged material shall be place within designated ocean disposal areas or zones, as shown on contract drawings.

B. The use of bottom dump barges and dredges and hydraulic unloading barges and hopper dredges to dispose of dredged material in the offshore disposal area will be permitted. Water and excavated material shall not be permitted to overflow or spill out of barges, dump scows, or hopper dredges while in route to the disposal site. Failure to repair leaks or change the method of operation, which is resulting in overflow or spillage, will result in suspension of excavation operations and require prompt repair or change of operation to prevent overflow or spillage as a prerequisite to the resumption of excavation. Material shall be placed in the offshore disposal area below the –25 MLW level, and within [XX]feet of the center of the defined disposal area or zone.

II. Electronic Tracking System (ETS) for Ocean Disposal Vessels

The Contractor shall furnish an ETS for surveillance of the movement and disposition of dredged material during [excavation and ocean disposal] [excavation and disposal (nearshore and ocean)]. This ETS shall be established, operated and maintained by the Contractor to continuously track in real-time the horizontal location and draft condition of the disposal vessel for the entire dredging cycle, including dredging area and disposal area. The ETS shall be capable of displaying and recording in real-time the disposal vessel's draft and location.

A. ETS Standards

The Contractor shall provide automated (computer) system and components to perform in accordance with EM 1110-1-2909. A copy of the EM can be downloaded from the following website: http://www.usace.army.mil/inet/usace-docs'eng-manuals/em.htm. Horizontal location shall have an accuracy equal to or better than a standard DGPS system, equal to or better than plus/minus 10 feet (horizontal repeatability). Vertical (draft) data shall have an accuracy of plus/minus 0.5 foot. Horizontal location and vertical data shall be collected in sets and each data set shall be referenced in real-time to date and local time (to nearest minute), and shall be referenced to the same state plane coordinate system used for the survey(s) shown in the contract plans. The ETS shall be calibrated, as required, in the presence of the COR at the work location before disposal operations have started, and at 30-day intervals while work is in progress. The COR shall have access to the ETS in order to observe its operation. Disposal operations will not commence until the ETS to be used by the Contractor is certified by the COR to be operational and within acceptable accuracy. It is the Contractor's responsibility to select a system that will operate properly at the work location. The complete system shall be subject to the COR's approval.

B. Data Requirements and Submissions

1. The ETS for each disposal vessel shall be in operation for all dredging and disposal activities and shall record the full round trip for each loading and disposal cycle. [Note: A dredging and disposal

cycle constitutes the time from commencement of dredging to complete discharge of the material.] The COR shall be notified immediately in the event of ETS failure and all dredging operations for the vessel shall cease until the ETS is fully operational. Any delays resulting from ETS failure shall be at the contractor's expense.

2. All data shall be collected and stored on 3 1/2 inch disk or CD-ROM(s) in ASCII format using IBM compatible MS-DOS 5.0 or later version. Each dredging and disposal cycle will be a separate and distinct ASCII file, labeled by the trip number. More than one file may be stored on the disk(s) or CD-ROM(s).

3. Data shall be collected, during the dredging and disposal cycle, every 500 feet (at least) during travel to the disposal area, and every minute or every 200 feet, whichever is smaller, while approaching within 1,000 feet and within the disposal area.

4. The required digital data to be collected for each dredging and disposal cycle includes the following:

(1) Trip Number
(2) Date
(3) Time
(4) Vessel ID
(5) Vessel Captain
(6) State Plane X Coordinate - in accordance with c. above
(7) State Plane Y Coordinate - in accordance with c. above
(8) Vessel Draft
(9) Type of Disposal Vessel
(10) Exact State Plane X & Y coordinate at start of dump
(11) Volume of Material Disposed

5. Plot Reporting (2 types):

(a) Tracking Plot - For each disposal event, data collected while the disposal vessel is in the vicinity of the disposal area shall be plotted in chart form, in 200-foot intervals, to show the track and draft of the disposal vessel approaching and traversing the disposal area. Each plot will be attached to the corresponding ascii data table when submitted.

(b) Scatter Plot - Following completion of all disposal events, a single and separate plot will be prepared to show the exact disposal locations of all dumps. Every plotted location shall coincide with the beginning of the respective dump. Each dump will be labeled with the corresponding Trip Number and shall be at a small but readable scale. To accompany the Scatter Plot, a single and separate table will be prepared of the corresponding ETS data for every dump location. The volume of material disposed for each trip will be included in this table.

6. All digital ETS data shall be furnished to the COR within 24 hours of collection. The digital plot files should be in an easily readable format such as Adobe Acrobat PDF file, Microstation DGN file, JPEG, BMP, TIFF, or similar. The hardcopy of the ETS data and tracking plots shall be both maintained onboard the vessel and submitted to the COR on a weekly basis.

Appendix C

Hazardous, Toxic, and Radioactive Waste Plan
(Environmental Data Resources, Inc.)

Bayou Casotte Harbor Improvement Project

Bayou Casotte Harbor Improvement Project

Pascagoula, MS 39581

Inquiry Number: 3202932.1

November 08, 2011

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Date EDR Searched Historical Sources:

Aerial Photography November 08, 2011

Target Property:

Bayou Casotte Harbor Improvement Project

Pascagoula, MS 39581

Year	***Scale***	***Details***	***Source***
1940	Aerial Photograph. Scale: 1"=1000'	Panel #: 30088-C5, Pascagoula South, MS;/Flight Date: October 27, 1940	EDR
1952	Aerial Photograph. Scale: 1"=1000'	Panel #: 30088-C5, Pascagoula South, MS;/Flight Date: April 30, 1952	EDR
1955	Aerial Photograph. Scale: 1"=500'	Panel #: 30088-C5, Pascagoula South, MS;/Flight Date: March 15, 1955	EDR
1972	Aerial Photograph. Scale: 1"=750'	Panel #: 30088-C5, Pascagoula South, MS;/Flight Date: May 04, 1972	EDR
1975	Aerial Photograph. Scale: 1"=500'	Panel #: 30088-C5, Pascagoula South, MS;/Flight Date: March 09, 1975	EDR
1980	Aerial Photograph. Scale: 1"=1000'	Panel #: 30088-C5, Pascagoula South, MS;/Flight Date: April 09, 1980	EDR
1985	Aerial Photograph. Scale: 1"=1000'	Panel #: 30088-C5, Pascagoula South, MS;/Flight Date: March 25, 1985	EDR
1992	Aerial Photograph. Scale: 1"=500'	Panel #: 30088-C5, Pascagoula South, MS;/Composite DOQQ - acquisition dates: February 19, 1992	EDR
1994	Aerial Photograph. Scale: 1"=1000'	Panel #: 30088-C5, Pascagoula South, MS;/Flight Date: November 30, 1994	EDR
2005	Aerial Photograph. Scale: 1"=500'	Panel #: 30088-C5, Pascagoula South, MS;/Flight Year: 2005	EDR
2007	Aerial Photograph. Scale: 1"=500'	Panel #: 30088-C5, Pascagoula South, MS;/Flight Year: 2007	EDR


INQUIRY #: 3202932.1
YEAR: 1940
= 1000'
N


INQUIRY #: 3202932.1
YEAR: 1952
= 1000'
N

INQUIRY #: 3202932.1

YEAR: 1955

= 500'

N


INQUIRY #: 3202932.1
YEAR: 1972
= 750'
N


INQUIRY #: 3202932.1
YEAR: 1975
= 500'
N

INQUIRY #: 3202932.1

YEAR: 1980

= 1000'

N


INQUIRY #: 3202932.1
YEAR: 1985
= 1000'
N


INQUIRY #: 3202932.1
YEAR: 1992
= 500'
N

INQUIRY #: 3202932.1
YEAR: 1994
= 1000'
N


INQUIRY #: 3202932.1
YEAR: 2005
= 500'
N


INQUIRY #: 3202932.1
YEAR: 2007
= 500'
N

Bayou Casotte Harbor Improvement Project
Pascagoula, MS 39581

Inquiry Number: 3197815.1s
November 02, 2011

EDR DataMap™ Corridor Study

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

TARGET PROPERTY INFORMATION

ADDRESS

PASCAGOULA, MS 39581
PASCAGOULA, MS 39581

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL LIENS	Federal Superfund Liens
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
LIENS 2	CERCLA Lien Information
RCRA-SQG	RCRA - Small Quantity Generators
RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generator
RCRA-NonGen	RCRA - Non Generators
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
DOT OPS	Incident and Accident Data
US CDL	Clandestine Drug Labs
US BROWNFIELDS	A Listing of Brownfields Sites
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
LUCIS	Land Use Control Information System
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
ODI	Open Dump Inventory
MINES	Mines Master Index File
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
RAATS	RCRA Administrative Action Tracking System

EXECUTIVE SUMMARY

SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
US HIST CDL	National Clandestine Laboratory Register
PCB TRANSFORMER	PCB Transformer Registration Database
FEDERAL FACILITY	Federal Facility Site Information listing
COAL ASH DOE	Sleam-Electric Plan Operation Data
FEMA UST	Underground Storage Tank Listing

STATE AND LOCAL RECORDS

MS SWF/LF	Solid Waste Landfills
MS DEBRIS	Debris Site Locations Listing
MS UIC	UIC Information
MS SWTIRE	Commercial Waste Tire Haulers
MS SWRCY	Mississippi Recycling Directory
MS LUST	Leaking Underground Storage Tank Database
MS UST	Underground Storage Tanks
MS AST	Aboveground Storage Tanks
MS PERMITS	Environmental Site Information System Listing
MS DRYCLEANERS	Drycleaner Facilities Listing
MS BROWNFIELDS	Uncontrolled Sites List
MS NPDES	Industrial & Municipal NPDES Facilities
MS ASBESTOS	Asbestos Project Listing

TRIBAL RECORDS

INDIAN RESERV	Indian Reservations
INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land
INDIAN VCP	Voluntary Cleanup Priority Listing

EDR PROPRIETARY RECORDS

Manufactured Gas Plants	EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL RECORDS

CERC-NFRAP: Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

A review of the CERC-NFRAP list, as provided by EDR, and dated 02/25/2011 has revealed that there is

EXECUTIVE SUMMARY

1 CERC-NFRAP site within the searched area.

Site	Address	Map ID	Page
CHEVRON PRODUCTS COMPANY	***250 INDUSTRIAL RD***	***3***	***5***

CORRACTS: CORRACTS is a list of handlers with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every handler that has had corrective action activity.

A review of the CORRACTS list, as provided by EDR, and dated 03/09/2011 has revealed that there is 1 CORRACTS site within the searched area.

Site	Address	Map ID	Page
CHEVRON PRODUCTS COMPANY	***250 INDUSTRIAL RD***	***3***	***5***

RCRA-TSDF: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRA-TSDF list, as provided by EDR, and dated 06/15/2011 has revealed that there is 1 RCRA-TSDF site within the searched area.

Site	Address	Map ID	Page
CHEVRON PRODUCTS COMPANY	***250 INDUSTRIAL RD***	***3***	***5***

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 06/15/2011 has revealed that there is 1 RCRA-LQG site within the searched area.

Site	Address	Map ID	Page
CHEVRON PRODUCTS COMPANY	***250 INDUSTRIAL RD***	***3***	***5***

EXECUTIVE SUMMARY

TRIS: The Toxic Chemical Release Inventory System identifies facilities that release toxic chemicals to the air, water, and land in reportable quantities under SARA Title III, Section 313. The source of this database is the U.S. EPA.

A review of the TRIS list, as provided by EDR, and dated 12/31/2009 has revealed that there is 1 TRIS site within the searched area.

Site	Address	Map ID	Page
CHEVRON PRODUCTS COMPANY	***250 INDUSTRIAL RD***	***3***	***5***

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 04/14/2010 has revealed that there is 1 FINDS site within the searched area.

Site	Address	Map ID	Page
CHEVRON PRODUCTS COMPANY	***250 INDUSTRIAL RD***	***3***	***5***

STATE AND LOCAL RECORDS

MS SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Environmental Quality's Uncontrolled Site Project Tracking System.

A review of the MS SHWS list, as provided by EDR, and dated 09/06/2011 has revealed that there are 5 MS SHWS sites within the searched area.

Site	Address	Map ID	Page
HALTER MARINE PASCAGOULA - 511 Status: SNFA		1	3
CHICAGO BRIDGE & IRON (CBI)		1	3
PORT OF PASCAGOULA - GREENWOOD Status: RUAO		***2***	***4***
PORT OF PASCAGOULA Status: SNFA		***2***	***4***
GSPC- CORNING GLASS (00793) Status: SNFA		***3***	***64***

EXECUTIVE SUMMARY

MS ENG CONTROLS: Sites included on the CERCLA/Uncontrolled Sites File List that have Engineering Controls. Engineering Controls encompass a variety of engineered remedies to contain and/or reduce contamination, and/or physical barriers intended to limit access to property. ECs include fences, signs, guards, landfill caps, provision of potable water, slurry walls, sheet pile , (vertical caps) pumping and treatment of groundwater, monitoring wells, and vapor extraction systems

A review of the MS ENG CONTROLS list, as provided by EDR, and dated 09/06/2011 has revealed that there is 1 MS ENG CONTROLS site within the searched area.

Site	Address	Map ID	Page
PORT OF PASCAGOULA		***2***	***4***

MS INST CONTROL: Sites included on the CERCLA/Uncontrolled Sites File List that have Institutional and/or Engineering Controls.

A review of the MS INST CONTROL list, as provided by EDR, and dated 09/06/2011 has revealed that there are 2 MS INST CONTROL sites within the searched area.

Site	Address	Map ID	Page
PORT OF PASCAGOULA - GREENWOOD		***2***	***4***
PORT OF PASCAGOULA		***2***	***4***

MS VCP: Voluntary Evaluation Program Sites.

A review of the MS VCP list, as provided by EDR, and dated 09/06/2011 has revealed that there is 1 MS VCP site within the searched area.

Site	Address	Map ID	Page
GSPC- CORNING GLASS (00793)		***3***	***64***

CA HAZNET: The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000-1,000,000 annually, representing approximately 350,000-500,000 shipments. Data from non-California manifests & continuation sheets are not included at the present time. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, & disposal method. The source is the Department of Toxic Substance Control is the agency

A review of the CA HAZNET list, as provided by EDR, has revealed that there is 1 CA HAZNET site within the searched area.

Site	Address	Map ID	Page
CHEVRON PRODUCTS COMPANY	***250 INDUSTRIAL RD***	***3***	***5***

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.

MAP FINDINGS SUMMARY

FEDERAL RECORDS

Database	Total Plotted
NPL	0
Proposed NPL	0
Delisted NPL	0
NPL LIENS	0
CERCLIS	0
CERC-NFRAP	1
LIENS 2	0
CORRACTS	1
RCRA-TSDF	1
RCRA-LQG	1
RCRA-SQG	0
RCRA-CESQG	0
RCRA-NonGen	0
US ENG CONTROLS	0
US INST CONTROL	0
ERNS	0
HMIRS	0
DOT OPS	0
US CDL	0
US BROWNFIELDS	0
DOD	0
FUDS	0
LUCIS	0
CONSENT	0
ROD	0
UMTRA	0
DEBRIS REGION 9	0
ODI	0
MINES	0
TRIS	1
TSCA	0
FTTS	0
HIST FTTS	0
SSTS	0
ICIS	0
PADS	0
MLTS	0
RADINFO	0
FINDS	1
RAATS	0
SCRD DRYCLEANERS	0
COAL ASH EPA	0
US HIST CDL	0
PCB TRANSFORMER	0
FEDERAL FACILITY	0
COAL ASH DOE	0
FEMA UST	0

STATE AND LOCAL RECORDS

Database	Total Plotted
MS SHWS	5

MAP FINDINGS SUMMARY

Database	Total Plotted
MS SWF/LF	0
MS DEBRIS	0
MS UIC	0
MS SWTIRE	0
MS SWRCY	0
MS LUST	0
MS UST	0
MS AST	0
MS PERMITS	0
MS ENG CONTROLS	1
MS INST CONTROL	2
MS VCP	1
MS DRYCLEANERS	0
MS BROWNFIELDS	0
CA HAZNET	1
MS NPDES	0
MS ASBESTOS	0

TRIBAL RECORDS

Database	Total Plotted
INDIAN RESERV	0
INDIAN ODI	0
INDIAN LUST	0
INDIAN UST	0
INDIAN VCP	0

EDR PROPRIETARY RECORDS

Database	Total Plotted
Manufactured Gas Plants	0

NOTES:

Sites may be listed in more than one database

1 **HALTER MARINE PASCAGOULA - 5110 WASHINGTON AVE** **MS SHWS** **S106593078** **N/A**

PASCAGOULA, MS

SHWS:

Lat/Long (dms):	30 20 52.25 / 88 30 43.70
Site Size (acres):	<1
EPA ID:	Not reported
Project Manager:	Not reported
Status:	**SNFA**
State No Further Action Date:	01/24/2004
Date Phase I Assessment Conducted:	Not reported
Federal:	Not reported
Federal No Further Action Date:	Not reported
Soil Contamination:	No
Surface Water Contamination:	No
Ground Water Contamination:	No
Remediation Type:	Not reported
Surface Water Remediation:	Not reported
GW Remediation Type:	Not reported
Maj. Contaminant:	None
High Concentration:	Not reported
High Concentration Units:	Not reported
Institutional Control:	Not reported
Engineering Control:	Not reported
Voluntary Cleanups:	Not reported
Date Section 128(a) Assessment:	Not reported
Date TBA Requested:	Not reported

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1 **CHICAGO BRIDGE & IRON (CBI)** **MS SHWS** **S106592971** **N/A**

PASCAGOULA, MS

SHWS:

Lat/Long (dms):	30 20 51.70 / 88 30 37.60
Site Size (acres):	Not reported
EPA ID:	MSD092685205
Project Manager:	Not reported
Status:	**Not reported**
State No Further Action Date:	Not reported
Date Phase I Assessment Conducted:	Not reported
Federal:	Archive
Federal No Further Action Date:	02/25/1998
Soil Contamination:	No
Surface Water Contamination:	No
Ground Water Contamination:	No
Remediation Type:	Not reported
Surface Water Remediation:	Not reported
GW Remediation Type:	Not reported
Maj. Contaminant:	NO DATA
High Concentration:	Not reported
High Concentration Units:	Not reported
Institutional Control:	Not reported
Engineering Control:	Not reported
Voluntary Cleanups:	Not reported
Date Section 128(a) Assessment:	Not reported
Date TBA Requested:	Not reported

Map ID Direction Distance Distance (ft.)	Site	Database(s)	EDR ID Number EPA ID Number
2	**PORT OF PASCAGOULA - GREENWOOD ISLAND SITE** **PASCAGOULA, MS**	**MS SHWS** **MS INST CONTROL**	**S106593330** **N/A**

SHWS:

Lat/Long (dms):	30 20 25.80 / 88 30 55
Site Size (acres):	100
EPA ID:	Not reported
Project Manager:	Russell, Tony
Status:	**RUAO**
State No Further Action Date:	03/31/1998
Date Phase I Assessment Conducted:	Not reported
Federal:	Not reported
Federal No Further Action Date:	Not reported
Soil Contamination:	Yes
Surface Water Contamination:	No
Ground Water Contamination:	No
Remediation Type:	CAP
Surface Water Remediation:	Not reported
GW Remediation Type:	Not reported
Maj. Contaminant:	Lead
High Concentration:	6.65E+03
High Concentration Units:	mg/kg
Institutional Control:	03/31/1998
Engineering Control:	Not reported
Voluntary Cleanups:	Not reported
Date Section 128(a) Assessment:	Not reported
Date TBA Requested:	Not reported

INST CONTROL:

Institutional Control: 03/31/1998

2	**PORT OF PASCAGOULA** **PASCAGOULA, MS**	**MS SHWS** **MS ENG CONTROLS** **MS INST CONTROL**	**S104240617** **N/A**

SHWS:

Lat/Long (dms):	30 20 50 / 88 30 12
Site Size (acres):	7
EPA ID:	Not reported
Project Manager:	Bailey, Taaka
Status:	**SNFA**
State No Further Action Date:	02/08/2007
Date Phase I Assessment Conducted:	Not reported
Federal:	Not reported
Federal No Further Action Date:	Not reported
Soil Contamination:	Yes
Surface Water Contamination:	No
Ground Water Contamination:	Yes
Remediation Type:	E
Surface Water Remediation:	Not reported
GW Remediation Type:	Not reported
Maj. Contaminant:	Lead
High Concentration:	2.00E+03
High Concentration Units:	mg/Kg
Institutional Control:	04/03/1998
Engineering Control:	Y
Voluntary Cleanups:	Not reported
Date Section 128(a) Assessment:	Not reported

PORT OF PASCAGOULA (Continued) **S104240617**

Date TBA Requested: Not reported

ENG CONTROLS:
Engineering Controls: Yes

INST CONTROL:
Institutional Control: 04/03/1998

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3 **CHEVRON PRODUCTS COMPANY**
250 INDUSTRIAL RD
PASCAGOULA, MS 39567

CERC-NFRAP
CORRACTS
RCRA-TSDF
RCRA-LQG
TRIS
FINDS
CA HAZNET

1000433760
39567CHVRNPO

CERC-NFRAP:
Site ID: 0402355
Federal Facility: Not a Federal Facility
NPL Status: Not on the NPL
Non NPL Status: Deferred to RCRA

CERCLIS-NFRAP Site Contact Details:
Contact Sequence ID: 4570190.00000
Person ID: 4000051.00000

Contact Sequence ID: 4752808.00000
Person ID: 4000275.00000

Contact Sequence ID: 4777828.00000
Person ID: 13002428.00000

CERCLIS-NFRAP Site Alias Name(s):
Alias Name: CHEVRON USA INC PASCAGOUALA REFINERY
Alias Address: Not reported
JACKSON, MS

Alias Name: CHEVRON USA INC PASCAGOUALA REFINERY
Alias Address: INDUSTRIAL HWY
PASCAGOULA-CONFID, MS 39567

Program Priority:
Description: RCRA Deferral - Lead Confirmed

CERCLIS-NFRAP Assessment History:
Action: DISCOVERY
Date Started: Not reported
Date Completed: 08/01/1980
Priority Level: Not reported

Action: PRELIMINARY ASSESSMENT
Date Started: Not reported
Date Completed: 11/01/1982
Priority Level: NFRAP-Site does not qualify for the NPL based on existing information

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Action: SITE INSPECTION
Date Started: Not reported
Date Completed: 11/01/1982
Priority Level: Deferred to RCRA (Subtitle C)

Action: ARCHIVE SITE
Date Started: Not reported
Date Completed: 12/23/1996
Priority Level: Not reported

CORRACTS:

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 01/04/2007
Action: CA100 - RFI Imposition
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: 12/19/2006
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 01/19/1988
Action: CA080
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 01/20/1993
Action: CA100 - RFI Imposition
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 01/22/1998
Action: CA105

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: 12/31/1997
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 01/22/1998
Action: CA140 - RFI Workplan Notice Of Deficiency Issued
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: 12/31/1997
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: RDS CATALYST TRANSFER PAD
Actual Date: 02/19/2003
Action: CA640
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 02/28/1994
Action: CA110 - RFI Workplan Received
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: 02/04/1994
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 02/28/1996
Action: CA104
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 03/15/1985
Action: CA050 - RFA Completed
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: SWMU 69
Actual Date: 03/17/1999
Action: CA375 - Decision On Petition For No Further Action
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 03/20/2001
Action: CA186
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 03/31/1992
Action: CA075ME - CA Prioritization, Facility or area was assigned a medium corrective action priority
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 03/31/1996
Action: CA110 - RFI Workplan Received
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 03/31/1997
Action: CA184
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 04/02/1996
Action: CA050 - RFA Completed
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 04/02/2004
Action: CA340 - CMS Report Received
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: 01/28/2004
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 04/05/1996
Action: CA725IN - Current Human Exposures Under Control, More information is needed to make a determination

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 04/05/1996
Action: CA750IN - Migration of Contaminated Groundwater under Control, More information is needed to make a determination
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: RDS CATALYST TRANSFER PAD
Actual Date: 04/07/2003
Action: CA650 - Stabilization Construction Completed
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 04/13/2004
Action: CA350 - CMS Approved
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 04/15/1986
Action: CA100 - RFI Imposition
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: CORNING LANDFILL & LAGOONS
Actual Date: 04/23/2002
Action: CA550 - Certification Of Remedy Completion Or Construction Completion
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 05/03/2004
Action: CA400 - Date For Remedy Selection (CM Imposed)
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 05/16/2002
Action: CA200 - RFI Approved
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 05/16/2002
Action: CA375 - Decision On Petition For No Further Action
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 05/16/2002
Action: CA250 - CMS Imposition
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 05/19/2003
Action: CA300 - CMS Workplan Approved
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 05/20/2008
Action: CA750YE - Migration of Contaminated Groundwater under Control, Yes, Migration of Contaminated Groundwater Under Control has been verified
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 05/20/2008
Action: CA750 - Migration of Contaminated Groundwater under Control
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: 09/30/2003
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 06/03/1994
Action: CA150 - RFI Workplan Approved

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 06/06/1996
Action: CA140 - RFI Workplan Notice Of Deficiency Issued
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 06/17/1993
Action: CA110 - RFI Workplan Received
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: 06/18/1993
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: Entire Faclity except SWMUs 10, 76, 77
Actual Date: 06/28/2007
Action: CA550RC
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 07/31/1995
Action: CA184
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 08/07/1997
Action: CA104
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 09/06/1990
Action: CA050 - RFA Completed
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 09/11/1996
Action: CA630
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 09/11/1996
Action: CA600SR - Stabilization Measures Implemented, Primary measure is source removal and/or treatment
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 09/16/2002
Action: CA260 - CMS Workplan Received
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 09/24/2009
Action: CA550RC
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 09/29/2000
Action: CA725YE - Current Human Exposures Under Control, Yes, Current Human Exposures Under Control has been verified
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 09/30/1998
Action: CA150 - RFI Workplan Approved
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 09/30/1998
Action: CA106

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 09/30/2001
Action: CA184
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 10/02/1987
Action: CA110 - RFI Workplan Received
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 10/03/2000
Action: CA184
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: RDS CATALYST TRANSFER PAD
Actual Date: 10/03/2002
Action: CA610
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 10/11/1995
Action: CA186
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 10/21/1997
Action: CA075HI - CA Prioritization, Facility or area was assigned a high corrective action priority
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 10/26/1997
Action: CA100 - RFI Imposition
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: 10/26/1997
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 10/26/1997
Action: CA650 - Stabilization Construction Completed
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 11/24/1996
Action: CA105
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: 11/30/1993
Action: CA140 - RFI Workplan Notice Of Deficiency Issued
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MSD054179403
EPA Region: 04
Area Name: ENTIRE FACILITY
Actual Date: Not reported
Action: CA200 - RFI Approved
NAICS Code(s): 32411 32511 325188 325311
Petroleum Refineries
Petrochemical Manufacturing
All Other Basic Inorganic Chemical Manufacturing
Nitrogenous Fertilizer Manufacturing
Original schedule date: 01/29/2010
Schedule end date: Not reported

RCRA-TSDF:
Date form received by agency: 02/24/2010
Facility name: CHEVRON PRODUCTS COMPANY
Facility address: 250 INDUSTRIAL ROAD
PASCAGOULA, MS 39581
EPA ID: MSD054179403
Mailing address: P.O. BOX 1300
PASCAGOULA, MS 39568
Contact: KENNETH E TAYLOR
Contact address: INDUSTRIAL ROAD
PASCAGOULA, MS 39581
Contact country: US
Contact telephone: (228) 934-7680
Contact email: KTAYLOR@CHEVRON.COM
EPA Region: 04
Land type: Private
Classification: TSDF
Description: Handler is engaged in the treatment, storage or disposal of hazardous waste

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Classification: Large Quantity Generator
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name: CHEVRON USA
Owner/operator address: P.O. BOX 1300
PASCAGOULA, MS 00003
Owner/operator country: Not reported
Owner/operator telephone: (601) 938-4600
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: CHEVRON PRODUCTS COMPANY
Owner/operator address: Not reported
Not reported
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 11/07/1961
Owner/Op end date: Not reported

Owner/operator name: CHEVRON CORPORATION
Owner/operator address: BOLLINGER CANYON ROAD
SAN RAMON, CA 94583
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 11/07/1961
Owner/Op end date: Not reported

Owner/operator name: CHEVRON USA, INC.
Owner/operator address: 575 MARKET STREET
SAN FRANCISCO, CA 94105
Owner/operator country: Not reported
Owner/operator telephone: (415) 894-7700
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: Yes
Transporter of hazardous waste: No
Treater, storer or disposer of HW: Yes
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:

Date form received by agency: 02/27/2008
Facility name: CHEVRON PRODUCTS COMPANY
Classification: Large Quantity Generator

Date form received by agency: 01/31/2006
Facility name: CHEVRON PRODUCTS COMPANY
Site name: CHEVRON PRODUCTS COMPANY PASCAGOULA
Classification: Large Quantity Generator

Date form received by agency: 02/12/2004
Facility name: CHEVRON PRODUCTS COMPANY
Classification: Large Quantity Generator

Date form received by agency: 02/07/2002
Facility name: CHEVRON PRODUCTS COMPANY
Classification: Large Quantity Generator

Date form received by agency: 12/04/2000
Facility name: CHEVRON PRODUCTS COMPANY
Site name: CHEVRON PRODUCTS CO-PASCAGOULA REFINERY
Classification: Large Quantity Generator

Date form received by agency: 06/10/1998
Facility name: CHEVRON PRODUCTS COMPANY
Site name: CHEVRON PRODUCTS CO-PASCAGOULA REFINERY
Classification: Large Quantity Generator

Date form received by agency: 03/31/1997
Facility name: CHEVRON PRODUCTS COMPANY
Site name: CHEVRON (PASCAGOULA REFINERY)
Classification: Large Quantity Generator

Date form received by agency: 02/28/1996
Facility name: CHEVRON PRODUCTS COMPANY
Site name: CHEVRON
Classification: Large Quantity Generator

Date form received by agency: 12/14/1994
Facility name: CHEVRON PRODUCTS COMPANY
Site name: CHEVRON (PASCAGOULA REFINERY)

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Classification: Not a generator, verified

Date form received by agency: 02/28/1994
Facility name: CHEVRON PRODUCTS COMPANY
Site name: CHEVRON
Classification: Large Quantity Generator

Date form received by agency: 03/01/1992
Facility name: CHEVRON PRODUCTS COMPANY
Site name: CHEVRON
Classification: Large Quantity Generator

Date form received by agency: 03/29/1990
Facility name: CHEVRON PRODUCTS COMPANY
Site name: CHEVRON (PASCAGOULA REFINERY)
Classification: Large Quantity Generator

Date form received by agency: 03/08/1990
Facility name: CHEVRON PRODUCTS COMPANY
Site name: CHEVRON U.S.A, INC.
Classification: Large Quantity Generator

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE,

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F004
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: CRESOLS AND CRESYLIC ACID, AND NITROBENZENE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: K048
Waste name: DISSOLVED AIR FLOTATION (DAF) FLOAT FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K049
Waste name: SLOP OIL EMULSION SOLIDS FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K050
Waste name: HEAT EXCHANGER BUNDLE CLEANING SLUDGE FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K051
Waste name: API SEPARATOR SLUDGE FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K052
Waste name: TANK BOTTOMS (LEADED) FROM THE PETROLEUM REFINING INDUSTRY

Waste code: P012
Waste name: ARSENIC OXIDE AS2O3

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Waste code: P014
Waste name: BENZENETHIOL

Waste code: P018
Waste name: BRUCINE

Waste code: P022
Waste name: CARBON DISULFIDE

Waste code: P048
Waste name: 2,4-DINITROPHENOL

Waste code: P054
Waste name: AZIRIDINE

Waste code: P098
Waste name: POTASSIUM CYANIDE

Waste code: P105
Waste name: SODIUM AZIDE

Waste code: P110
Waste name: PLUMBANE, TETRAETHYL-

Waste code: P119
Waste name: AMMONIUM VANADATE

Waste code: P120
Waste name: VANADIUM OXIDE V2O5

Waste code: U002
Waste name: ACETONE (I)

Waste code: U007
Waste name: ACRYLAMIDE

Waste code: U012
Waste name: ANILINE (I,T)

Waste code: U019
Waste name: BENZENE (I,T)

Waste code: U031
Waste name: 1-BUTANOL (I)

Waste code: U044
Waste name: CHLOROFORM

Waste code: U052
Waste name: CRESOL (CRESYLIC ACID)

Waste code: U055
Waste name: BENZENE, (1-METHYLETHYL)- (I)

Waste code: U056
Waste name: BENZENE, HEXAHYDRO- (I)

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Waste code: U069
Waste name: 1,2-BENZENEDICARBOXYLIC ACID, DIBUTYL ESTER

Waste code: U080
Waste name: METHANE, DICHLORO-

Waste code: U083
Waste name: PROPANE, 1,2-DICHLORO-

Waste code: U101
Waste name: 2,4-DIMETHYLPHENOL

Waste code: U108
Waste name: 1,4-DIETHYLENEOXIDE

Waste code: U112
Waste name: ACETIC ACID ETHYL ESTER (I)

Waste code: U122
Waste name: FORMALDEHYDE

Waste code: U134
Waste name: HYDROFLUORIC ACID (C,T)

Waste code: U141
Waste name: 1,3-BENZODIOXOLE, 5-(1-PROPENYL)-

Waste code: U144
Waste name: ACETIC ACID, LEAD(2+) SALT

Waste code: U154
Waste name: METHANOL (I)

Waste code: U159
Waste name: 2-BUTANONE (I,T)

Waste code: U161
Waste name: METHYL ISOBUTYL KETONE (I)

Waste code: U165
Waste name: NAPHTHALENE

Waste code: U169
Waste name: BENZENE, NITRO-

Waste code: U188
Waste name: PHENOL

Waste code: U190
Waste name: 1,3-ISOBENZOFURANDIONE

Waste code: U196
Waste name: PYRIDINE

Waste code: U197
Waste name: P-BENZOQUINONE

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Waste code: U211
Waste name: CARBON TETRACHLORIDE

Waste code: U220
Waste name: BENZENE, METHYL-

Waste code: U239
Waste name: BENZENE, DIMETHYL- (I,T)

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: D004
Waste name: ARSENIC

Waste code: D005
Waste name: BARIUM

Waste code: D006
Waste name: CADMIUM

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D009
Waste name: MERCURY

Waste code: D010
Waste name: SELENIUM

Waste code: D011
Waste name: SILVER

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Waste code: D018
Waste name: BENZENE

Waste code: D019
Waste name: CARBON TETRACHLORIDE

Waste code: D021
Waste name: CHLOROBENZENE

Waste code: D022
Waste name: CHLOROFORM

Waste code: D023
Waste name: O-CRESOL

Waste code: D024
Waste name: M-CRESOL

Waste code: D025
Waste name: P-CRESOL

Waste code: D026
Waste name: CRESOL

Waste code: D028
Waste name: 1,2-DICHLOROETHANE

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: D036
Waste name: NITROBENZENE

Waste code: D037
Waste name: PENTRACHLOROPHENOL

Waste code: D038
Waste name: PYRIDINE

Waste code: D039
Waste name: TETRACHLOROETHYLENE

Waste code: D040
Waste name: TRICHLOROETHYLENE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE,

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METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F037
Waste name: PETROLEUM REFINERY PRIMARY OIL/WATER/SOLIDS SEPARATION SLUDGE-ANY SLUDGE GENERATED FROM THE GRAVITATIONAL SEPARATION OF OIL/WATER/SOLIDS DURING THE STORAGE OR TREATMENT OF PROCESS WASTEWATERS AND OILY COOLING WASTEWATERS FROM PETROLEUM REFINERIES. SUCH SLUDGES INCLUDE, BUT ARE NOT LIMITED TO, THOSE GENERATED IN: OIL/WATER/SOLIDS SEPARATORS; TANKS AND IMPOUNDMENTS; DITCHES AND OTHER CONVEYANCES; SUMPS; AND STORMWATER UNITS RECEIVING DRY WEATHER FLOW. SLUDGE GENERATED IN STORMWATER UNITS THAT DO NOT RECEIVE DRY WEATHER FLOW, SLUDGES GENERATED FROM NON-CONTACT ONCE-THROUGH COOLING WATERS SEGREGATED FOR TREATMENT FROM OTHER PROCESS OR OILY COOLING WATERS, SLUDGES GENERATED IN AGGRESSIVE BIOLOGICAL TREATMENT UNITS AS DEFINED IN SECTION 261.31(B)(2) (INCLUDING SLUDGES GENERATED IN ONE OR MORE ADDITIONAL UNITS AFTER WASTEWATERS HAVE BEEN TREATED IN AGGRESSIVE BIOLOGICAL TREATMENT UNITS) AND K051 WASTES ARE NOT INCLUDED IN THIS LISTING.

Waste code: F038
Waste name: PETROLEUM REFINERY SECONDARY (EMULSIFIED) OIL/WATER/SOLIDS SEPARATION SLUDGE-ANY SLUDGE AND/OR FLOAT GENERATED FROM THE PHYSICAL AND/OR CHEMICAL SEPARATION OF OIL/WATER/SOLIDS IN PROCESS WASTEWATERS AND OILY COOLING WASTEWATERS FROM PETROLEUM REFINERIES. SUCH WASTES INCLUDE, BUT ARE NOT LIMITED TO, ALL SLUDGES AND FLOATS GENERATED IN: INDUCED AIR FLOTATION (IAF) UNITS, TANKS AND IMPOUNDMENTS, AND ALL SLUDGES GENERATED IN DAF UNITS. SLUDGES GENERATED IN STORMWATER UNITS THAT DO NOT RECEIVE DRY WEATHER FLOW, SLUDGES GENERATED FROM NON-CONTACT ONCE-THROUGH COOLING WATERS SEGREGATED FOR TREATMENT FROM

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OTHER PROCESS OR OILY COOLING WATERS, SLUDGES AND FLOATS GENERATED IN AGGRESSIVE BIOLOGICAL TREATMENT UNITS AS DEFINED IN SECTION 261.31(B)(2) (INCLUDING SLUDGES AND FLOATS GENERATED IN ONE OR MORE ADDITIONAL UNITS AFTER WASTEWATERS HAVE BEEN TREATED IN AGGRESSIVE BIOLOGICAL TREATMENT UNITS) AND F037, K048, AND K051 WASTES ARE NOT INCLUDED IN THIS LISTING.

Waste code: K048
Waste name: DISSOLVED AIR FLOTATION (DAF) FLOAT FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K049
Waste name: SLOP OIL EMULSION SOLIDS FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K050
Waste name: HEAT EXCHANGER BUNDLE CLEANING SLUDGE FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K051
Waste name: API SEPARATOR SLUDGE FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K052
Waste name: TANK BOTTOMS (LEADED) FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K169
Waste name: Crude oil storage tank sediment from petroleum refining operations.

Waste code: K170
Waste name: Clarified slurry oil storage tank sediment and/or in-line filter/separation solids from petroleum refining operations.

Waste code: K171
Waste name: Spent hydrotreating catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (excludes inert support media)

Waste code: K172
Waste name: Spent hydro refining catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (excludes inert support media).

Waste code: P012
Waste name: ARSENIC OXIDE AS2O3

Waste code: P014
Waste name: BENZENETHIOL

Waste code: P018
Waste name: BRUCINE

Waste code: P022
Waste name: CARBON DISULFIDE

Waste code: P030
Waste name: CYANIDES (SOLUBLE CYANIDE SALTS), NOT OTHERWISE SPECIFIED

Waste code: P048

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Waste name: 2,4-DINITROPHENOL

Waste code: P054
Waste name: AZIRIDINE

Waste code: P098
Waste name: POTASSIUM CYANIDE

Waste code: P105
Waste name: SODIUM AZIDE

Waste code: P110
Waste name: PLUMBANE, TETRAETHYL-

Waste code: P119
Waste name: AMMONIUM VANADATE

Waste code: P120
Waste name: VANADIUM OXIDE V2O5

Waste code: U002
Waste name: ACETONE (I)

Waste code: U007
Waste name: ACRYLAMIDE

Waste code: U012
Waste name: ANILINE (I,T)

Waste code: U019
Waste name: BENZENE (I,T)

Waste code: U031
Waste name: 1-BUTANOL (I)

Waste code: U044
Waste name: CHLOROFORM

Waste code: U051
Waste name: CREOSOTE

Waste code: U052
Waste name: CRESOL (CRESYLIC ACID)

Waste code: U055
Waste name: BENZENE, (1-METHYLETHYL)- (I)

Waste code: U056
Waste name: BENZENE, HEXAHYDRO- (I)

Waste code: U080
Waste name: METHANE, DICHLORO-

Waste code: U083
Waste name: PROPANE, 1,2-DICHLORO-

Waste code: U101

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Waste name: 2,4-DIMETHYLPHENOL

Waste code: U108
Waste name: 1,4-DIETHYLENEOXIDE

Waste code: U112
Waste name: ACETIC ACID ETHYL ESTER (I)

Waste code: U122
Waste name: FORMALDEHYDE

Waste code: U134
Waste name: HYDROFLUORIC ACID (C,T)

Waste code: U141
Waste name: 1,3-BENZODIOXOLE, 5-(1-PROPENYL)-

Waste code: U144
Waste name: ACETIC ACID, LEAD(2+) SALT

Waste code: U154
Waste name: METHANOL (I)

Waste code: U159
Waste name: 2-BUTANONE (I,T)

Waste code: U161
Waste name: METHYL ISOBUTYL KETONE (I)

Waste code: U165
Waste name: NAPHTHALENE

Waste code: U169
Waste name: BENZENE, NITRO-

Waste code: U188
Waste name: PHENOL

Waste code: U190
Waste name: 1,3-ISOBENZOFURANDIONE

Waste code: U196
Waste name: PYRIDINE

Waste code: U197
Waste name: P-BENZOQUINONE

Waste code: U211
Waste name: CARBON TETRACHLORIDE

Waste code: U220
Waste name: BENZENE, METHYL-

Waste code: U226
Waste name: ETHANE, 1,1,1-TRICHLORO-

Waste code: U227

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Waste name: ETHANE, 1,1,2-TRICHLORO-

Waste code: U239
Waste name: BENZENE, DIMETHYL- (I,T)

Waste code: D000
Waste name: Not Defined

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL

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ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F004
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: CRESOLS AND CRESYLIC ACID, AND NITROBENZENE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: K048
Waste name: DISSOLVED AIR FLOTATION (DAF) FLOAT FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K049
Waste name: SLOP OIL EMULSION SOLIDS FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K050
Waste name: HEAT EXCHANGER BUNDLE CLEANING SLUDGE FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K051
Waste name: API SEPARATOR SLUDGE FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K052
Waste name: TANK BOTTOMS (LEADED) FROM THE PETROLEUM REFINING INDUSTRY

Waste code: P012
Waste name: ARSENIC OXIDE AS2O3

Waste code: P014
Waste name: BENZENETHIOL

Waste code: P015
Waste name: BERYLLIUM

Waste code: P018
Waste name: BRUCINE

Waste code: P022
Waste name: CARBON DISULFIDE

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Waste code: P048
Waste name: 2,4-DINITROPHENOL

Waste code: P054
Waste name: AZIRIDINE

Waste code: P098
Waste name: POTASSIUM CYANIDE

Waste code: P105
Waste name: SODIUM AZIDE

Waste code: P110
Waste name: PLUMBANE, TETRAETHYL-

Waste code: P119
Waste name: AMMONIUM VANADATE

Waste code: P120
Waste name: VANADIUM OXIDE V2O5

Waste code: U002
Waste name: ACETONE (I)

Waste code: U012
Waste name: ANILINE (I,T)

Waste code: U018
Waste name: BENZ[A]ANTHRACENE

Waste code: U019
Waste name: BENZENE (I,T)

Waste code: U022
Waste name: BENZO[A]PYRENE

Waste code: U031
Waste name: 1-BUTANOL (I)

Waste code: U044
Waste name: CHLOROFORM

Waste code: U050
Waste name: CHRYSENE

Waste code: U052
Waste name: CRESOL (CRESYLIC ACID)

Waste code: U055
Waste name: BENZENE, (1-METHYLETHYL)- (I)

Waste code: U056
Waste name: BENZENE, HEXAHYDRO- (I)

Waste code: U069
Waste name: 1,2-BENZENEDICARBOXYLIC ACID, DIBUTYL ESTER

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Waste code: U080
Waste name: METHANE, DICHLORO-

Waste code: U101
Waste name: 2,4-DIMETHYLPHENOL

Waste code: U107
Waste name: 1,2-BENZENEDICARBOXYLIC ACID, DIOCTYL ESTER

Waste code: U108
Waste name: 1,4-DIETHYLENEOXIDE

Waste code: U112
Waste name: ACETIC ACID ETHYL ESTER (I)

Waste code: U122
Waste name: FORMALDEHYDE

Waste code: U134
Waste name: HYDROFLUORIC ACID (C,T)

Waste code: U135
Waste name: HYDROGEN SULFIDE

Waste code: U140
Waste name: ISOBUTYL ALCOHOL (I,T)

Waste code: U141
Waste name: 1,3-BENZODIOXOLE, 5-(1-PROPENYL)-

Waste code: U144
Waste name: ACETIC ACID, LEAD(2+) SALT

Waste code: U151
Waste name: MERCURY

Waste code: U154
Waste name: METHANOL (I)

Waste code: U159
Waste name: 2-BUTANONE (I,T)

Waste code: U161
Waste name: METHYL ISOBUTYL KETONE (I)

Waste code: U165
Waste name: NAPHTHALENE

Waste code: U169
Waste name: BENZENE, NITRO-

Waste code: U188
Waste name: PHENOL

Waste code: U190
Waste name: 1,3-ISOBENZOFURANDIONE

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Waste code: U196
Waste name: PYRIDINE

Waste code: U211
Waste name: CARBON TETRACHLORIDE

Waste code: U220
Waste name: BENZENE, METHYL-

Waste code: U239
Waste name: BENZENE, DIMETHYL- (I,T)

Waste code: D000
Waste name: Not Defined

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE

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OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F004
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: CRESOLS AND CRESYLIC ACID, AND NITROBENZENE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: K048
Waste name: DISSOLVED AIR FLOTATION (DAF) FLOAT FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K049
Waste name: SLOP OIL EMULSION SOLIDS FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K050
Waste name: HEAT EXCHANGER BUNDLE CLEANING SLUDGE FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K051
Waste name: API SEPARATOR SLUDGE FROM THE PETROLEUM REFINING INDUSTRY

Waste code: K052
Waste name: TANK BOTTOMS (LEADED) FROM THE PETROLEUM REFINING INDUSTRY

Waste code: P012
Waste name: ARSENIC OXIDE AS2O3

Waste code: P014
Waste name: BENZENETHIOL

Waste code: P015

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Waste name: BERYLLIUM

Waste code: P018
Waste name: BRUCINE

Waste code: P022
Waste name: CARBON DISULFIDE

Waste code: P048
Waste name: 2,4-DINITROPHENOL

Waste code: P054
Waste name: AZIRIDINE

Waste code: P098
Waste name: POTASSIUM CYANIDE

Waste code: P105
Waste name: SODIUM AZIDE

Waste code: P110
Waste name: PLUMBANE, TETRAETHYL-

Waste code: P119
Waste name: AMMONIUM VANADATE

Waste code: P120
Waste name: VANADIUM OXIDE V2O5

Waste code: U002
Waste name: ACETONE (I)

Waste code: U012
Waste name: ANILINE (I,T)

Waste code: U018
Waste name: BENZ[A]ANTHRACENE

Waste code: U019
Waste name: BENZENE (I,T)

Waste code: U022
Waste name: BENZO[A]PYRENE

Waste code: U031
Waste name: 1-BUTANOL (I)

Waste code: U044
Waste name: CHLOROFORM

Waste code: U050
Waste name: CHRYSENE

Waste code: U052
Waste name: CRESOL (CRESYLIC ACID)

Waste code: U055

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Waste name: BENZENE, (1-METHYLETHYL)- (I)

Waste code: U056
Waste name: BENZENE, HEXAHYDRO- (I)

Waste code: U069
Waste name: 1,2-BENZENEDICARBOXYLIC ACID, DIBUTYL ESTER

Waste code: U080
Waste name: METHANE, DICHLORO-

Waste code: U101
Waste name: 2,4-DIMETHYLPHENOL

Waste code: U107
Waste name: 1,2-BENZENEDICARBOXYLIC ACID, DIOCTYL ESTER

Waste code: U108
Waste name: 1,4-DIETHYLENEOXIDE

Waste code: U112
Waste name: ACETIC ACID ETHYL ESTER (I)

Waste code: U122
Waste name: FORMALDEHYDE

Waste code: U134
Waste name: HYDROFLUORIC ACID (C,T)

Waste code: U135
Waste name: HYDROGEN SULFIDE

Waste code: U140
Waste name: ISOBUTYL ALCOHOL (I,T)

Waste code: U141
Waste name: 1,3-BENZODIOXOLE, 5-(1-PROPENYL)-

Waste code: U144
Waste name: ACETIC ACID, LEAD(2+) SALT

Waste code: U151
Waste name: MERCURY

Waste code: U154
Waste name: METHANOL (I)

Waste code: U159
Waste name: 2-BUTANONE (I,T)

Waste code: U161
Waste name: METHYL ISOBUTYL KETONE (I)

Waste code: U165
Waste name: NAPHTHALENE

Waste code: U169

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Waste name: BENZENE, NITRO-

Waste code: U188
Waste name: PHENOL

Waste code: U190
Waste name: 1,3-ISOBENZOFURANDIONE

Waste code: U196
Waste name: PYRIDINE

Waste code: U211
Waste name: CARBON TETRACHLORIDE

Waste code: U220
Waste name: BENZENE, METHYL-

Waste code: U239
Waste name: BENZENE, DIMETHYL- (I,T)

Biennial Reports:

Last Biennial Reporting Year: 2011

Annual Waste Handled:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Amount (Lbs): 37740

Waste code: D006
Waste name: CADMIUM
Amount (Lbs): 650

Waste code: D007
Waste name: CHROMIUM
Amount (Lbs): 36960

Waste code: D008
Waste name: LEAD
Amount (Lbs): 59305

Waste code: D009
Waste name: MERCURY
Amount (Lbs): 940

Waste code: D035
Waste name: METHYL ETHYL KETONE
Amount (Lbs): 36960

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

	ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs):	41796
Waste code:	F005
Waste name:	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs):	41796
Waste code:	F037
Waste name:	PETROLEUM REFINERY PRIMARY OIL/WATER/SOLIDS SEPARATION SLUDGE-ANY SLUDGE GENERATED FROM THE GRAVITATIONAL SEPARATION OF OIL/WATER/SOLIDS DURING THE STORAGE OR TREATMENT OF PROCESS WASTEWATERS AND OILY COOLING WASTEWATERS FROM PETROLEUM REFINERIES. SUCH SLUDGES INCLUDE, BUT ARE NOT LIMITED TO, THOSE GENERATED IN: OIL/WATER/SOLIDS SEPARATORS; TANKS AND IMPOUNDMENTS; DITCHES AND OTHER CONVEYANCES; SUMPS; AND STORMWATER UNITS RECEIVING DRY WEATHER FLOW. SLUDGE GENERATED IN STORMWATER UNITS THAT DO NOT RECEIVE DRY WEATHER FLOW, SLUDGES GENERATED FROM NON-CONTACT ONCE-THROUGH COOLING WATERS SEGREGATED FOR TREATMENT FROM OTHER PROCESS OR OILY COOLING WATERS, SLUDGES GENERATED IN AGGRESSIVE BIOLOGICAL TREATMENT UNITS AS DEFINED IN SECTION 261.31(B)(2) (INCLUDING SLUDGES GENERATED IN ONE OR MORE ADDITIONAL UNITS AFTER WASTEWATERS HAVE BEEN TREATED IN AGGRESSIVE BIOLOGICAL TREATMENT UNITS) AND K051 WASTES ARE NOT INCLUDED IN THIS LISTING.
Amount (Lbs):	3519010
Waste code:	K169
Waste name:	Crude oil storage tank sediment from petroleum refining operations.
Amount (Lbs):	460360
Waste code:	K171
Waste name:	Spent hydrotreating catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (excludes inert support media)
Amount (Lbs):	4656680
Waste code:	U019
Waste name:	BENZENE (I,T)
Amount (Lbs):	780
Waste code:	U044
Waste name:	CHLOROFORM
Amount (Lbs):	4836
Waste code:	U159

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Waste name: 2-BUTANONE (I,T)
Amount (Lbs): 4836

Waste code: U220
Waste name: BENZENE, METHYL-
Amount (Lbs): 780

Waste code: U239
Waste name: BENZENE, DIMETHYL- (I,T)
Amount (Lbs): 780

Corrective Action Summary:

Event date: 03/15/1985
Event: RFA Completed

Event date: 04/15/1986
Event: RFI Imposition

Event date: 10/02/1987
Event: RFI Workplan Received

Event date: 01/19/1988
Event: CA080

Event date: 09/06/1990
Event: RFA Completed

Event date: 03/31/1992
Event: CA Prioritization, Facility or area was assigned a medium corrective action priority.

Event date: 01/20/1993
Event: RFI Imposition

Event date: 06/17/1993
Event: RFI Workplan Received

Event date: 11/30/1993
Event: RFI Workplan Notice Of Deficiency Issued

Event date: 02/28/1994
Event: RFI Workplan Received

Event date: 06/03/1994
Event: RFI Workplan Approved

Event date: 07/31/1995
Event: CA184

Event date: 10/11/1995
Event: CA186

Event date: 02/28/1996
Event: CA104

Event date: 03/31/1996

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Event:	RFI Workplan Received
Event date:	04/02/1996
Event:	RFA Completed
Event date:	04/05/1996
Event:	Igration of Contaminated Groundwater under Control, More information is needed to make a determination.
Event date:	04/05/1996
Event:	Current Human Exposures under Control, More information is needed to make a determination.
Event date:	06/06/1996
Event:	RFI Workplan Notice Of Deficiency Issued
Event date:	09/11/1996
Event:	CA630
Event date:	09/11/1996
Event:	Stabilization Measures Implemented, Primary measure is source removal and/or treatment (e.g., soil or waste excavation, in-situ soil treatment, off-site treatment).
Event date:	11/24/1996
Event:	CA105
Event date:	03/31/1997
Event:	CA184
Event date:	08/07/1997
Event:	CA104
Event date:	10/21/1997
Event:	CA Prioritization, Facility or area was assigned a high corrective action priority.
Event date:	10/26/1997
Event:	Stabilization Construction Completed
Event date:	10/26/1997
Event:	RFI Imposition
Event date:	01/22/1998
Event:	CA105
Event date:	01/22/1998
Event:	RFI Workplan Notice Of Deficiency Issued
Event date:	09/30/1998
Event:	CA106
Event date:	09/30/1998
Event:	RFI Workplan Approved
Event date:	03/17/1999
Event:	Decision On Petition For No Further Action

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Event date: 09/29/2000
Event: Current Human Exposures under Control, Yes, Current Human Exposures Under Control has been verified. Based on a review of information contained in the EI determination, current human exposures are expected to be under control at the facility under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

Event date: 10/03/2000
Event: CA184

Event date: 03/20/2001
Event: CA186

Event date: 09/30/2001
Event: CA184

Event date: 04/23/2002
Event: Certification Of Remedy Completion Or Construction Completion

Event date: 05/16/2002
Event: CMS Imposition

Event date: 05/16/2002
Event: RFI Approved

Event date: 05/16/2002
Event: Decision On Petition For No Further Action

Event date: 09/16/2002
Event: CMS Workplan Received

Event date: 10/03/2002
Event: CA610

Event date: 02/19/2003
Event: CA640

Event date: 04/07/2003
Event: Stabilization Construction Completed

Event date: 05/19/2003
Event: CMS Workplan Approved

Event date: 04/02/2004
Event: CMS Report Received

Event date: 04/13/2004
Event: CMS Approved

Event date: 05/03/2004
Event: Date For Remedy Selection (CM Imposed)

Event date: 01/04/2007
Event: RFI Imposition

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Event date: 06/28/2007
Event: CA550RC

Event date: 05/20/2008
Event: Igration of Contaminated Groundwater under Control

Event date: 05/20/2008
Event: Igration of Contaminated Groundwater under Control, Yes, Migration of Contaminated Groundwater Under Control has been verified. Based on a review of information contained in the EI determination, it has been determined that migration of contaminated groundwater is under control at the facility. Specifically, this determination indicates that the migration of contaminated groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater. This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

Event date: 09/24/2009
Event: CA550RC

Event date: Not reported
Event: RFI Approved

Facility Has Received Notices of Violations:

Regulation violated: Not reported
Area of violation: Generators - General
Date violation determined: 02/02/2009
Date achieved compliance: 05/11/2009
Violation lead agency: EPA
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - 262.34(a)(2)
Area of violation: Generators - Pre-transport
Date violation determined: 04/30/1996
Date achieved compliance: 04/30/1996
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 04/30/1996
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - 268.7(a)
Area of violation: TSD - Manifest/Records/Reporting
Date violation determined: 04/30/1996
Date achieved compliance: 04/30/1996

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 04/30/1996
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - 262.34(a)(3)
Area of violation: Generators - Pre-transport
Date violation determined: 04/30/1996
Date achieved compliance: 04/30/1996
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 04/30/1996
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: FR - 40 cfr 262.34 (a)(2)
Area of violation: TSD - Container Use and Management
Date violation determined: 04/04/1996
Date achieved compliance: 04/30/1996
Violation lead agency: EPA
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: FR - 40 cfr 262.34(a)(3)
Area of violation: TSD - Container Use and Management
Date violation determined: 04/04/1996
Date achieved compliance: 04/30/1996
Violation lead agency: EPA
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - MHWSR 262.32 & 262.34
Area of violation: TSD - Container Use and Management
Date violation determined: 11/22/1991
Date achieved compliance: 01/17/1992
Violation lead agency: State

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Enforcement action: VERBAL INFORMAL
Enforcement action date: 12/16/1991
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - MHWSR 262.32 & 262.34
Area of violation: TSD - Container Use and Management
Date violation determined: 11/22/1991
Date achieved compliance: 01/17/1992
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 01/02/1992
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - MHWSR 262.32 & 262.34
Area of violation: TSD - Container Use and Management
Date violation determined: 11/22/1991
Date achieved compliance: 01/17/1992
Violation lead agency: State
Enforcement action: FINAL 3008(A) COMPLIANCE ORDER
Enforcement action date: 08/11/1992
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - MHWSR VCI OF PERMIT
Area of violation: TSD - Surface Impoundment Standards
Date violation determined: 11/22/1991
Date achieved compliance: 01/17/1992
Violation lead agency: State
Enforcement action: VERBAL INFORMAL
Enforcement action date: 12/16/1991
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - MHWSR VCI OF PERMIT
Area of violation: TSD - Surface Impoundment Standards
Date violation determined: 11/22/1991
Date achieved compliance: 01/17/1992
Violation lead agency: State
Enforcement action: FINAL 3008(A) COMPLIANCE ORDER

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Enforcement action date: 08/11/1992
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - MHWSR VCI OF PERMIT
Area of violation: TSD - Surface Impoundment Standards
Date violation determined: 11/22/1991
Date achieved compliance: 01/17/1992
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 01/02/1992
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - MHWSR 262.32 & 262.34
Area of violation: TSD - Container Use and Management
Date violation determined: 11/22/1991
Date achieved compliance: 01/17/1992
Violation lead agency: State
Enforcement action: VERBAL INFORMAL
Enforcement action date: 04/29/1992
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - MHWSR VCI OF PERMIT
Area of violation: TSD - Surface Impoundment Standards
Date violation determined: 11/22/1991
Date achieved compliance: 01/17/1992
Violation lead agency: State
Enforcement action: VERBAL INFORMAL
Enforcement action date: 04/29/1992
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: SR - MHWMR 262.34(C)(1)
Area of violation: Generators - General
Date violation determined: 06/05/1990
Date achieved compliance: 07/06/1990
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 06/27/1990

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 08/14/1989
Date achieved compliance: 09/13/1989
Violation lead agency: State
Enforcement action: FINAL 3008(A) COMPLIANCE ORDER
Enforcement action date: 10/12/1989
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 5600
Final penalty amount: 5600
Paid penalty amount: 5600

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 08/14/1989
Date achieved compliance: 09/13/1989
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 08/30/1989
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 08/14/1989
Date achieved compliance: 11/10/1989
Violation lead agency: State
Enforcement action: FINAL 3008(A) COMPLIANCE ORDER
Enforcement action date: 10/12/1989
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 5600
Final penalty amount: 5600
Paid penalty amount: 5600

Regulation violated: Not reported
Area of violation: TSD - Financial Requirements
Date violation determined: 03/30/1989
Date achieved compliance: 05/08/1989
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 04/06/1989
Enf. disposition status: Not reported

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 06/27/1988
Date achieved compliance: 08/26/1988
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 07/25/1988
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: Not reported
Area of violation: TSD IS-Ground-Water Monitoring
Date violation determined: 12/18/1987
Date achieved compliance: 04/08/1988
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/23/1988
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 07/27/1987
Date achieved compliance: 11/13/1987
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 10/12/1987
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 07/27/1987
Date achieved compliance: 11/13/1987
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 08/31/1987
Enf. disposition status: Not reported
Enf. disp. status date: Not reported

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 07/27/1987
Date achieved compliance: 11/13/1987
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 07/27/1987
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Regulation violated: Not reported
Area of violation: TSD IS-Ground-Water Monitoring
Date violation determined: 07/02/1985
Date achieved compliance: 07/09/1985
Violation lead agency: EPA
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: 0
Final penalty amount: 0
Paid penalty amount: 0

Evaluation Action Summary:
Evaluation date: 04/21/2011
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 08/20/2010
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/12/2010
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/02/2010
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Evaluation date:	06/16/2009
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	EPA
Evaluation date:	04/14/2009
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	03/03/2009
Evaluation:	NON-FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	02/03/2009
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	02/02/2009
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Generators - General
Date achieved compliance:	05/11/2009
Evaluation lead agency:	EPA
Evaluation date:	09/30/2008
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	04/08/2008
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	03/04/2008
Evaluation:	NON-FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	07/18/2007
Evaluation:	NON-FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	06/11/2007
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 09/07/2006
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/09/2006
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 11/03/2005
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/07/2005
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 12/08/2004
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/09/2004
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 05/18/2004
Evaluation: OPERATION AND MAINTENANCE INSPECTION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/05/2004
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 01/07/2004
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA-Initiated Oversight/Observation/Training Actions

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Evaluation date: 01/07/2004
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/31/2003
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/06/2003
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/25/2002
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/14/2002
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 08/22/2001
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/03/2001
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/02/2001
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/25/2000
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/05/2000
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 05/22/2000
Evaluation: OPERATION AND MAINTENANCE INSPECTION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/07/2000
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/29/1999
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/01/1999
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/09/1999
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 06/13/1998
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/31/1998
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/10/1998
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA-Initiated Oversight/Observation/Training Actions

Evaluation date: 03/05/1998
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Evaluation date: 10/07/1997
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 07/10/1997
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 05/07/1997
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/02/1997
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/11/1997
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 06/13/1996
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/08/1996
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/04/1996
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - Pre-transport
Date achieved compliance: 04/30/1996
Evaluation lead agency: State

Evaluation date: 04/04/1996
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - Manifest/Records/Reporting
Date achieved compliance: 04/30/1996
Evaluation lead agency: State

Evaluation date: 04/04/1996
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - Container Use and Management

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Date achieved compliance: 04/30/1996
Evaluation lead agency: EPA

Evaluation date: 09/20/1995
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 05/01/1995
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/30/1995
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 01/04/1995
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: TSD - General
Date achieved compliance: 08/26/1988
Evaluation lead agency: State

Evaluation date: 01/04/1995
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: TSD - General
Date achieved compliance: 11/13/1987
Evaluation lead agency: State

Evaluation date: 01/04/1995
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: TSD - Financial Requirements
Date achieved compliance: 05/08/1989
Evaluation lead agency: State

Evaluation date: 01/04/1995
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Generators - General
Date achieved compliance: 07/06/1990
Evaluation lead agency: State

Evaluation date: 01/04/1995
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: TSD - Surface Impoundment Standards
Date achieved compliance: 01/17/1992
Evaluation lead agency: State

Evaluation date: 01/04/1995
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: TSD - General
Date achieved compliance: 09/13/1989
Evaluation lead agency: State

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Evaluation date:	01/04/1995
Evaluation:	NON-FINANCIAL RECORD REVIEW
Area of violation:	TSD IS-Ground-Water Monitoring
Date achieved compliance:	04/08/1988
Evaluation lead agency:	State

Evaluation date:	01/04/1995
Evaluation:	NON-FINANCIAL RECORD REVIEW
Area of violation:	TSD - General
Date achieved compliance:	11/10/1989
Evaluation lead agency:	State

Evaluation date:	01/04/1995
Evaluation:	NON-FINANCIAL RECORD REVIEW
Area of violation:	TSD - Container Use and Management
Date achieved compliance:	01/17/1992
Evaluation lead agency:	State

Evaluation date:	07/06/1994
Evaluation:	NON-FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State

Evaluation date:	04/29/1994
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State

Evaluation date:	04/19/1994
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State

Evaluation date:	04/19/1994
Evaluation:	OPERATION AND MAINTENANCE INSPECTION
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State

Evaluation date:	01/26/1994
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	EPA

Evaluation date:	01/05/1994
Evaluation:	NON-FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State

Evaluation date:	10/13/1993
Evaluation:	NON-FINANCIAL RECORD REVIEW
Area of violation:	Not reported

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/22/1993
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 08/11/1993
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 06/07/1993
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/04/1992
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 07/16/1992
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 07/15/1992
Evaluation: CORRECTIVE ACTION COMPLIANCE EVALUATION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/06/1992
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/01/1992
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 11/22/1991
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - Surface Impoundment Standards
Date achieved compliance: 01/17/1992
Evaluation lead agency: State

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Evaluation date: 11/22/1991
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - Container Use and Management
Date achieved compliance: 01/17/1992
Evaluation lead agency: State

Evaluation date: 11/21/1991
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA-Initiated Oversight/Observation/Training Actions

Evaluation date: 06/07/1991
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 12/31/1990
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 11/26/1990
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 06/05/1990
Evaluation: GROUNDWATER MONITORING EVALUATION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 06/05/1990
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 07/06/1990
Evaluation lead agency: State

Evaluation date: 04/27/1990
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/26/1990
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/05/1990
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/01/1990
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 08/14/1989
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 09/13/1989
Evaluation lead agency: State

Evaluation date: 08/14/1989
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 11/10/1989
Evaluation lead agency: State

Evaluation date: 03/30/1989
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: TSD - Financial Requirements
Date achieved compliance: 05/08/1989
Evaluation lead agency: State

Evaluation date: 02/23/1989
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/14/1988
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/13/1988
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 06/27/1988
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 08/26/1988
Evaluation lead agency: State

Evaluation date: 04/08/1988
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Evaluation date: 03/23/1988
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 12/18/1987
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: TSD IS-Ground-Water Monitoring
Date achieved compliance: 04/08/1988
Evaluation lead agency: State

Evaluation date: 12/11/1987
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/21/1987
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 07/27/1987
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: TSD - General
Date achieved compliance: 11/13/1987
Evaluation lead agency: State

Evaluation date: 07/16/1987
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/01/1987
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/22/1987
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 11/18/1986
Evaluation: GROUNDWATER MONITORING EVALUATION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 07/08/1986
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

Date achieved compliance: Not reported
Evaluation lead agency: EPA-Initiated Oversight/Observation/Training Actions

Evaluation date: 02/11/1986
Evaluation: FOCUSED COMPLIANCE INSPECTION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 07/02/1985
Evaluation: GROUNDWATER MONITORING EVALUATION
Area of violation: TSD IS-Ground-Water Monitoring
Date achieved compliance: 07/09/1985
Evaluation lead agency: EPA-Initiated Oversight/Observation/Training Actions

Evaluation date: 03/06/1985
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA-Initiated Oversight/Observation/Training Actions

FINDS:

Registry ID: 110000377477

Environmental Interest/Information System
Not reported

AFS (Aerometric Information Retrieval System (AIRS) Facility Subsystem) replaces the former Compliance Data System (CDS), the National Emission Data System (NEDS), and the Storage and Retrieval of Aerometric Data (SAROAD). AIRS is the national repository for information concerning airborne pollution in the United States. AFS is used to track emissions and compliance data from industrial plants. AFS data are utilized by states to prepare State Implementation Plans to comply with regulatory programs and by EPA as an input for the estimation of total national emissions. AFS is undergoing a major redesign to support facility operating permits required under Title V of the Clean Air Act.

CAMDBS (Clean Air Markets Division Business System) is a national information system that supports the implementation of market-based air pollution control programs administered by the Clean Air Markets Division, within the Office of Air and Radiation. These programs include the Acid Rain Program, established by Title IV of the Clean Air Act Amendments of 1990, and regional programs designed reduce the transport of ozone. These emissions trading programs allows regulated facilities (primarily electric utilities) to adopt the most cost-effective strategies to reduce emissions at their units. Units that reduce their emissions below the number of allowances they hold -- each allowance is equivalent to one ton of sulfur dioxide or nitrogen oxides -- may trade allowances with other units in their system, sell them to other utilities on the open market or through EPA auctions, or bank them to cover emissions in future years. CAMDBS functions include registering responsible officials, establishing allowance accounts, reporting hourly emissions data, and transferring allowances between accounts.

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

NCDB (National Compliance Data Base) supports implementation of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Toxic Substances Control Act (TSCA). The system tracks inspections in regions and states with cooperative agreements, enforcement actions, and settlements.

The NEI (National Emissions Inventory) database contains information on stationary and mobile sources that emit criteria air pollutants and their precursors, as well as hazardous air pollutants (HAPs).

US EPA TRIS (Toxics Release Inventory System) contains information from facilities on the amounts of over 300 listed toxic chemicals that these facilities release directly to air, water, land, or that are transported off-site.

US Emissions & Generation Resource Database (EGRID) contains data on emissions and resource mix for virtually every power plant and company that generates electricity in the United States.

MS-ENSITE (Mississippi - Tools For Environmental Management And Protection Organizations). Mississippi Department of Environmental Quality (MDEQ) Office of Pollution Control's (OPC) maintains enSite. It is the electronic Environmental Site Information System that that regulates compliance assurance, permitting, activity tracking, and maintenance of a single agency interest-link to definition master file.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

US Facility Response Plan (FRP) contains plans for responding, to the maximum extent practical, to worst case discharges of oil.

ICIS (Integrated Compliance Information System) is the Integrated Compliance Information System and provides a database that, when complete, will contain integrated Enforcement and Compliance information across most of EPA's programs. The vision for ICIS is to replace EPA's independent databases that contain Enforcement data with a single repository for that information. Currently, ICIS contains all Federal Administrative and Judicial enforcement actions. This information is maintained in ICIS by EPA in the Regional offices and it Headquarters. A future release of ICIS will replace the Permit Compliance System (PCS) which supports the NPDES and will integrate that information with Federal actions already in the system. ICIS also has the capability to track other activities occurring in the Region that support Compliance and Enforcement programs. These include; Incident Tracking, Compliance Assistance, and Compliance Monitoring.

PCS (Permit Compliance System) is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

CHEVRON PRODUCTS COMPANY (Continued) **1000433760**

US EPA RACT/BACT/LAER Clearinghouse (RBLC) database contains case-specific information on the "Best Available" air pollution technologies that have been required to reduce the emission of air pollutants from stationary sources (e.g., power plants, steel mills, chemical plants, etc.). RACT, or Reasonably Available Control Technology, is required on existing sources in areas that are not meeting national ambient air quality standards. BACT, or Best Available Control Technology, is required on major new or modified sources in clean areas. LAER, or Lowest Achievable Emission Rate, is required on major new or modified sources in non-attainment areas.

US EPA Risk Management Plan (RMP) database stores the risk management plans reported by companies that handle, manufacture, use, or store certain flammable or toxic substances, as required under section 112(r) of the Clean Air Act (CAA).

HAZNET:

Year:	2004
Gepaid:	MSD054179403
Contact:	WALLACE CALHOUN E CALHOUN
Telephone:	2289384694
Mailing Name:	Not reported
Mailing Address:	PO BOX 501
Mailing City,St,Zip:	PASCAGOULA, MS 39568
Gen County:	Not reported
TSD EPA ID:	CAD060398229
TSD County:	Los Angeles
Waste Category:	Other spent catalyst
Disposal Method:	Not reported
Tons:	5.6
Facility County:	Not reported

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3 **GSPC- CORNING GLASS (00793)** **MS SHWS** **S106861132**
MS VCP **N/A**

JACKSON (County), MS

SHWS:

Lat/Long (dms):	30 19 58.22 / 88 30 2.390
Site Size (acres):	<1
EPA ID:	Not reported
Project Manager:	Not reported
Status:	**SNFA**
State No Further Action Date:	09/12/2005
Date Phase I Assessment Conducted:	Not reported
Federal:	Not reported
Federal No Further Action Date:	Not reported
Soil Contamination:	No
Surface Water Contamination:	No
Ground Water Contamination:	No
Remediation Type:	Not reported
Surface Water Remediation:	Not reported
GW Remediation Type:	Not reported
Maj. Contaminant:	Mercury
High Concentration:	Not reported
High Concentration Units:	Not reported
Institutional Control:	Not reported

GSPC- CORNING GLASS (00793) (Continued) **S106861132**

Engineering Control: Not reported
Voluntary Cleanups: VEP
Date Section 128(a) Assessment: Not reported
Date TBA Requested: Not reported

VCP:
Voluntary Cleanup VEP or BF: VEP

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
ESCATAWPA	A100200851	RIVER BEND GROCERY #2	10524 HWY 613 N	39581	MS AST
JACKSON COUNTY	2007301715	BAYOU CASOTTE	BAYOU CASOTTE		ERNS
JACKSON COUNTY	2010934938	BAYOU CASSOTT NEXT TO CHEVRON	BAYOU CASSOTT NEXT TO CHEVRON		ERNS
JACKSON COUNTY	2011976567	CHEVRON PASAGOULA BAYOU CASOTTE	CHEVRON PASAGOULA BAYOU CASOTTE		ERNS
JACKSON COUNTY	2011973453	KENSINGTON BASIN 1310 HARBOR ROAD	KENSINGTON BASIN 1310 HARBOR ROAD		ERNS
JACKSON COUNTY	2011979478	OCEAN SPRING HARBOR BACK BAY OF BILOXI	OCEAN SPRING HARBOR BACK BAY OF BILOXI		ERNS
JACKSON COUNTY	2011981519	PAIGE BAYOU MARINA	PAIGE BAYOU MARINA		ERNS
JACKSON COUNTY	2011978389	PORT OF PASCAGOULA BAYOU CASOTTE	PORT OF PASCAGOULA BAYOU CASOTTE		ERNS
JACKSON COUNTY	2010931721	SLIP K68 1310 HARBOR RD	SLIP K68 1310 HARBOR RD		ERNS
JACKSON COUNTY	2011979234	UNKNOWN SHEEN INCIDENT NORTHBOUND ON BAY CASOTTE EAST SIDE	UNKNOWN SHEEN INCIDENT NORTHBOUND ON BAYOU CASOTTE EAST SIDE		ERNS
PASCAGOULA	U003773599	PARKER SERVICE CENTER	HWY 26 E	39567	MS UST
PASCAGOULA	94400083	HWY 611 BAYOU CASSOT	HWY 611 BAYOU CASSOT		ERNS
PASCAGOULA	94356372	HIGHWAY 611 BAYOU COSSOTTE	HIGHWAY 611 BAYOU COSSOTTE	39567	ERNS
PASCAGOULA	93310714	HWY 611 BAYOU CASOTTE	HWY 611 BAYOU CASOTTE	39567	ERNS
PASCAGOULA	93327470	HWY 611 BAYOU CASSOTTE	HWY 611 BAYOU CASSOTTE	39567	ERNS
PASCAGOULA	93304150	HWY 611 BAYOU CASSOTTE	HWY 611 BAYOU CASSOTTE	39567	ERNS
PASCAGOULA	89101033	HWY 611 AND INDUSTRIAL ROAD BAYOU CASOTTE	HWY 611 AND INDUSTRIAL ROAD BAYOU CASOTTE		ERNS
PASCAGOULA	92288235	HWY 611 BAYOU CASSOTTE	HWY 611 BAYOU CASSOTTE	39567	ERNS
PASCAGOULA	93312900	HWY 611 BAYOU CASOTTE	HWY 611 BAYOU CASOTTE	39567	ERNS
PASCAGOULA	92258974	HWY 611 BAYOU CASOTTE	HWY 611 BAYOU CASOTTE	39567	ERNS
PASCAGOULA	99643976	HWY 611 BAYOU CASSOTTE	HWY 611 BAYOU CASSOTTE	39581	ERNS
PASCAGOULA	98455321	HWY 611 BAYOU CASSOTTE	HWY 611 BAYOU CASSOTTE	39581	ERNS
PASCAGOULA	99652081	HWY 611 BAYOU CASSOTTE	HWY 611 BAYOU CASSOTTE	39581	ERNS
PASCAGOULA	99646508	HWY 611 BAYOU CASSOTTE	HWY 611 BAYOU CASSOTTE	39581	ERNS
PASCAGOULA	99653094	HWY 611 BAYOU CASSOTTE RAIL CAR LOADING RACK	HWY 611 BAYOU CASSOTTE RAIL CAR LOADING RACK	39581	ERNS
PASCAGOULA	98455715	HWY 611 BAYOU CASSOTTE	HWY 611 BAYOU CASSOTTE	39581	ERNS
PASCAGOULA	97406054	HWY 611 BAYOU CASSOTTE	HWY 611 BAYOU CASSOTTE	39581	ERNS
PASCAGOULA	1000475297	CARDOX CORP.	HIGHWAY 611	39567	RCRA-NonGen
PASCAGOULA	1003868130	CORNING GLASS WORKS PASCAGOULA PLANT	HWY 611	39567	CERC-NFRAP
PASCAGOULA	87145	HIGHWAY 611, BAYOU CASOTTE 88-29.30W/30-20.30N	HIGHWAY 611, BAYOU CASOTTE 88-29.30W/30-20.30N		ERNS
PASCAGOULA	1004743169	PIERCE SALES & SERVICE	11308 HIGHWAY 613 NORTH	39567	RCRA-CESQG, FINDS
PASCAGOULA	U003774786	MORGAN SHOPPING CENTER	HWY 613	39567	MS UST
PASCAGOULA	1004743196	PASCAGOULA AUTO SERVICE	10600 HIGHWAY 90	39567	RCRA-CESQG, FINDS
PASCAGOULA	92278843	BAYOU CASOTTE BTWEEN COKE DOCK AND NO.6	BAYOU CASOTTE BTWEEN COKE DOCK AND NO.6		ERNS
PASCAGOULA	94395968	BAYOU CASSOTTE CHANNEL CHEVRON REFINERY	BAYOU CASSOTTE CHANNEL CHEVRON REFINERY		ERNS
PASCAGOULA	94396052	BAYOU CASSOTTE MILE 1416 TO 1413	BAYOU CASSOTTE MILE 1416 TO 1413		ERNS
PASCAGOULA	93340769	BAYOU CASOTTE TIP OF NORTH END OF BAYOU	BAYOU CASOTTE TIP OF NORTH END OF BAYOU		ERNS
PASCAGOULA	93305571	BAYOU CASSAT INDUSTRIAL PARK	BAYOU CASSAT INDUSTRIAL PARK		ERNS
PASCAGOULA	93312902	BAYOU COSSOTTE TERMINAL G	BAYOU COSSOTTE TERMINAL G		ERNS
PASCAGOULA	92264150	BAYOU CASOTTE INDUSTIAL PARK	BAYOU CASOTTE INDUSTIAL PARK		ERNS

Count: 146 records

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
PASCAGOULA	92257074	BAYOU CASSOTE HEAD OF THE PRODUCT DOCK	BAYOU CASSOTE HEAD OF THE PRODUCT DOCK		ERNS
PASCAGOULA	92250778	BAYOU CASSOTTE	BAYOU CASSOTTE		ERNS
PASCAGOULA	91229140	BAYOU CASSOTT NO.4 BERTH	BAYOU CASSOTT NO.4 BERTH		ERNS
PASCAGOULA	91241393	BAYOU CASOTTE	BAYOU CASOTTE		ERNS
PASCAGOULA	91203041	BAYOU CASSOTTE CHEVRON LOADING	BAYOU CASSOTTE CHEVRON LOADING		ERNS
PASCAGOULA	91225053	BAYOU CASOTTE STENNIS INDUSTRIAL PARK HWY 611	BAYOU CASOTTE STENNIS INDUSTRIAL PARK HWY 611		ERNS
PASCAGOULA	96494465	BAYOU CASSOTE	BAYOU CASSOTE		ERNS
PASCAGOULA	94391733	BAYOU CASSOTTE/TURN BASIN	BAYOU CASSOTTE/TURN BASIN		ERNS
PASCAGOULA	99624801	BAYOU CASSOTT MISSISSIPPI	BAYOU CASSOTT MISSISSIPPI		ERNS
PASCAGOULA	91225004	BAYOU CASOTTE HARBOR	BAYOU CASOTTE HARBOR		ERNS
PASCAGOULA	99630074	BAYOU CASSOTTE CHANNEL, PRODUCT DOCK #3	BAYOU CASSOTTE CHANNEL, PRODUCT DOCK #3		ERNS
PASCAGOULA	99624024	BAYOU CASSOTTE HWY 611	BAYOU CASSOTTE HWY 611		ERNS
PASCAGOULA	91202571	BAYOU CASSOTTE WITHIN THE TURNING BASIN	BAYOU CASSOTTE WITHIN THE TURNING BASIN		ERNS
PASCAGOULA	2001554116	BAYOU CASOTTE	BAYOU CASOTTE	0	ERNS
PASCAGOULA	2002608050	BAYOU CASOTTE	BAYOU CASOTTE	0	ERNS
PASCAGOULA	2000535506	BAYOU CASOTTE	BAYOU CASOTTE	0	ERNS
PASCAGOULA	96481697	BAYOU CASOTTE HWY 613	BAYOU CASOTTE HWY 613	39567	ERNS
PASCAGOULA	96485126	BAYOU CASSOTTE TERMINAL E COUNTY SHIP DOCI	BAYOU CASSOTTE TERMINAL E COUNTY SHIP DOCK	39567	ERNS
PASCAGOULA	96477344	BAYOU CASOTTE HWY 613	BAYOU CASOTTE HWY 613	39567	ERNS
PASCAGOULA	98442064	BAYOU CASOTTE	BAYOU CASOTTE		ERNS
PASCAGOULA	98444457	BAYOU COSSOTTE	BAYOU COSSOTTE		ERNS
PASCAGOULA	90169025	BAYOU CASSOTTE BAYOU 2 BLOCKS NORTH OF INGALLS AVE.	BAYOU CASSOTTE BAYOU 2 BLOCKS NORTH OF INGALLS AVE.		ERNS
PASCAGOULA	89123346	BAYOU CASOTTE BETWEEN CHANNEL MARKERS 15 AND 11	BAYOU CASOTTE BETWEEN CHANNEL MARKERS 15 AND 11		ERNS
PASCAGOULA	89114204	BAYOU CASOTTE LAT 30 13.48 LONG 88 30.3	BAYOU CASOTTE LAT 30 13.48 LONG 88 30.3		ERNS
PASCAGOULA	93341276	BAYOU CASSOT CHEVRON FACILITY	BAYOU CASSOT CHEVRON FACILITY	39567	ERNS
PASCAGOULA	94395892	BAYOU CASSOTTE HWY 611	BAYOU CASSOTTE HWY 611	39567	ERNS
PASCAGOULA	2003636065	BAYOU CASOTTE	BAYOU CASOTTE		ERNS
PASCAGOULA	2008863845	BAYOU CASADE	BAYOU CASADE	39567	ERNS
PASCAGOULA	2007323335	BAYOU CASOTTE	BAYOU CASOTTE		ERNS
PASCAGOULA	2007331740	BAYOU CASADE	BAYOU CASADE		ERNS
PASCAGOULA	2006815131	BAYOU CASSOTTE	BAYOU CASSOTTE		ERNS
PASCAGOULA	2006813503	BAYOU CASSOUTE	BAYOU CASSOUTE		ERNS
PASCAGOULA	2007318965	BAYOU CASSOTT	BAYOU CASSOTT		ERNS
PASCAGOULA	2006785228	BAYOU CASADE	BAYOU CASADE	39567	ERNS
PASCAGOULA	2004716430	BAYOU CASOTTE	BAYOU CASOTTE		ERNS
PASCAGOULA	8871346	BAYOU CASOTTE CHEVRON DOCKS	BAYOU CASOTTE CHEVRON DOCKS		ERNS
PASCAGOULA	8864357	BAYOU CASETTE AT THE REFINERY	BAYOU CASETTE AT THE REFINERY		ERNS
PASCAGOULA	8852814	IN BAYOU CASOTTE BETWEEN CHANNEL MARKERS 15 AND 11 30-20-30N	IN BAYOU CASOTTE BETWEEN CHANNEL MARKERS 15 AND 11 30-20-30N		ERNS
PASCAGOULA	8868842	BAYOU COMPASS HWY 90 EAST RIGHT IN FRONT BILL JOHNSON GRO. S	BAYOU COMPASS HWY 90 EAST RIGHT IN FRONT BILL JOHNSON GRO. S		ERNS
PASCAGOULA	8850403	30-20-30N 88-29-30W BAYOU CASOTTE	30-20-30N 88-29-30W BAYOU CASOTTE		ERNS
PASCAGOULA	877345	IN BAYOU CASOTTE, BETWEEN MILE MARKER 15 AND 11 30-20-30N 88	IN BAYOU CASOTTE, BETWEEN MILE MARKER 15 AND 11 30-20-30N 88		ERNS

Count: 146 records ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
PASCAGOULA	8717840	BAYOU CASOTTE, INLET OFF OF THE MISS. SOUND, 88-29-30N 33-20	BAYOU CASOTTE, INLET OFF OF THE MISS. SOUND, 88-29-30N 33-20		ERNS
PASCAGOULA	96506277	BAYOU CASSOTTE CHEVRON PRODUCTS COMPANY DOCK	BAYOU CASSOTTE CHEVRON PRODUCTS COMPANY DOCK		ERNS
PASCAGOULA	96505101	BAYOU CASOTTE	BAYOU CASOTTE		ERNS
PASCAGOULA	87189	BAYOU CASOTTE, BTWN CHANNEL MARKERS 15 & 11 30 20 30N - 88 2	BAYOU CASOTTE, BTWN CHANNEL MARKERS 15 & 11 30 20 30N - 88 2		ERNS
PASCAGOULA	98424486	BAYOU CASSOTTE MID STREAM FUEL SERVICE DOCK	BAYOU CASSOTTE MID STREAM FUEL SERVICE DOCK		ERNS
PASCAGOULA	2010935304	NONE 601 BAYOU CASOTTE PARKWAY	601 BAYOUCASOTTE PKWY		ERNS
PASCAGOULA	2010934476	PASCAGOULA SHIPYARD 601 BAYOU CASOTTE PKW	601 BAYOUCASOTTE PKWY		ERNS
PASCAGOULA	1014477099	PASCAGOULA POINT PROPERTY	000 BEACH BLVD	39567	US BROWNFIELDS
PASCAGOULA	91206493	BERTH 5 CHEVRON REFINERY BAYOU CASSOTTE	BERTH 5 CHEVRON REFINERY BAYOU CASSOTTE		ERNS
PASCAGOULA	90161980	#6 BERTH AT BAYOU CASOTTE HWY 611 AT INDUSTRIAL RD	#6 BERTH AT BAYOU CASOTTE HWY 611 AT INDUSTRIAL RD		ERNS
PASCAGOULA	98441720	BOUY 11 ON BAYOU CASOTTE	BOUY 11 ON BAYOU CASOTTE		ERNS
PASCAGOULA	2010934703	BAYOU CASOTTE LAT: 30N 20' .735" LONG: 88W 30' .208"	BYU CASOTTE LAT 30N		ERNS
PASCAGOULA	90159691	CASOTTE BAYOU MISSISSIPPI SOUND CHANNEL MARKERS 11-15	CASOTTE BAYOU MISSISSIPPI SOUND CHANNEL MARKERS 11-15		ERNS
PASCAGOULA	94353274	CASOTTE	CASOTTE	39581	ERNS
PASCAGOULA	94391744	CASSOTTE BAYOU	CASSOTTE BAYOU	39567	ERNS
PASCAGOULA	8853439	CHEVORN USA REFINERY BAYOU CASOTTE BERTH #1	CHEVORN USA REFINERY BAYOU CASOTTE BERTH #1		ERNS
PASCAGOULA	93328811	CHEVRON PRODUCT DOCK BAYOU CASSOTTE BERT 1	CHEVRON PRODUCT DOCK BAYOU CASSOTTE BERTH 1		ERNS
PASCAGOULA	92265414	CHEVRON FACILITY IN BAYOU CASSOTTE	CHEVRON FACILITY IN BAYOU CASSOTTE		ERNS
PASCAGOULA	96489544	CHEVRON DOCKS BAYOA CASOTTE, NORTH OF THE #5 BERTH	CHEVRON DOCKS BAYOA CASOTTE, NORTH OF THE #5 BERTH		ERNS
PASCAGOULA	99652073	CHEVRON BAYOU CASSOTT	CHEVRON BAYOU CASSOTT		ERNS
PASCAGOULA	90189636	CHEVRON WHARF BAYOU CASOTTE	CHEVRON WHARF BAYOU CASOTTE		ERNS
PASCAGOULA	8871333	CHEVRON WHARF NEAR HWY 611 BAYOU CASOTTE	CHEVRON WHARF NEAR HWY 611 BAYOU CASOTTE		ERNS
PASCAGOULA	8852836	CHEVRON DOCK BAYOU CASOTTE 30-20-30N 88-29-30W	CHEVRON DOCK BAYOU CASOTTE 30-20-30N 88-29-30W		ERNS
PASCAGOULA	8855013	#3 CHEVRON BERTH BAYOU CASSOTTE	#3 CHEVRON BERTH BAYOU CASSOTTE		ERNS
PASCAGOULA	875079	CHEVRON WHARF, BAYOU CASOTTE CHANNEL, BTV MM 15 & 11 30-20-	CHEVRON WHARF, BAYOU CASOTTE CHANNEL, BTWN MM 15 & 11 30-20-		ERNS
PASCAGOULA	877743	CHEVRON WHARF ON THE BAYOU CASOTTE, BETWEEN MILE 11 AND 15	CHEVRON WHARF ON THE BAYOU CASOTTE, BETWEEN MILE 11 AND 15		ERNS
PASCAGOULA	97408968	CHEVRON PASCAGOULA BERTH 4 BAYOU CASOTTE	CHEVRON PASCAGOULA BERTH 4 BAYOU CASOTTE		ERNS
PASCAGOULA	1004743189	EXXON CO. USA #51199	US HIGHWAY 90 & CHICO ROAD	39567	RCRA-CESQG, FINDS
PASCAGOULA	1012217614	BAYOU CASOTTE ENERGY,CASOTTE LANDING	INDUSTRIAL ROAD	39567	FINDS
PASCAGOULA	92252886	INDUSTRIAL ROAD BAYOU CASOTTE	INDUSTRIAL ROAD BAYOU CASOTTE		ERNS
PASCAGOULA	1012085208	GULF LNG ENERGY LLC, LNG CLEAN ENERGY PROJECT	INDUSTRIAL ROAD	39567	FINDS
PASCAGOULA	1012082709	BAYOU CASOTTE ENERGY LLC, CASOTTE LANDING NATURAL GAS IMPORT	INDUSTRIAL ROAD	39567	FINDS

Count: 146 records ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
PASCAGOULA	92282963	INDUSTRIAL ROAD BAYOU CASSOTTE	INDUSTRIAL ROAD BAYOU CASSOTTE	39567	ERNS
PASCAGOULA	1014393682	GULF LNG ENERGY LIQUEFIED NATURAL GAS TE	INDUSTRIAL RD	39567	RCRA-CESQG
PASCAGOULA	1004743080	EQUIPMENT, INC.	3421 INDUSTRIAL HWY	39567	RCRA-CESQG, FINDS
PASCAGOULA	S103865667	MS PHOSPHATES CORP. GYPSUM STACK #2	601 INDUSTRIAL RD	39581	MS SWF/LF
PASCAGOULA	94399212	INNER HARBOR OF MISSISSIPPI SOUND USN PIERS	INNER HARBOR OF MISSISSIPPI SOUND USN PIERS		ERNS
PASCAGOULA	1001122135	JACKSON COUNTY PESTICIDE SITE	JACKSON COUNTY	39567	CERCLIS, FINDS
PASCAGOULA	1000692532	OSCO TREATMENT SYSTEMS OF MISSISSIPPI	JOHN C STENNIS INDUSTRIAL PARK	39567	RCRA-NonGen, FINDS
PASCAGOULA	89130958	LAT 30-20-30 LONG 088-29-30 BAYOU CASOTTE	LAT 30-20-30 LONG 088-29-30 BAYOU CASOTTE		ERNS
PASCAGOULA	8850407	LONG 88-29-30 LAT 30-20-30 BAYOU CASOTTE	LONG 88-29-30 LAT 30-20-30 BAYOU CASOTTE		ERNS
PASCAGOULA	1001221027	HAM MARINE, INC.	580 LOUISE ST	39581	RCRA-NonGen, FINDS
PASCAGOULA	U003775545	PROPOSED WALGREEN'S SITE	MARKET ST & HWY 90	39567	MS UST
PASCAGOULA	2010946933	MARTIN MIDSTREAM DOCK, BAYOU COSSATT	MARTIN MIDSTREAM DOCK BYU		ERNS
PASCAGOULA	984583381	MARY WALDER BAYOU PINTALOS MARINA	MARY WALDER BAYOU PINTALOS MARINA		ERNS
PASCAGOULA	2004729521	MCINNIS BAYOU	MCINNIS BAYOU		ERNS
PASCAGOULA	89121588	2 MILES OFFSHORE OF BAYOU CASOTTE IN GULF OFF OF JACKSON COU	2 MILES OFFSHORE OF BAYOU CASOTTE IN GULF OFF OF JACKSON COU		ERNS
PASCAGOULA	2010944296	MOUTH OF BAYOU CASOTTE	MOUTH OF BYU		ERNS
PASCAGOULA	93328763	NEAR THE CHEVRON WHARF ON BAYOU CASOTTE	NEAR THE CHEVRON WHARF ON BAYOU CASOTTE	39567	ERNS
PASCAGOULA	U001294866	PHILLIPS 66 #016657	OLD MOBILE HWY	39567	MS UST
PASCAGOULA	1004742654	DRIVE-IN CLEANERS	3215 OLD MOBILE HWY	39567	RCRA-CESQG, FINDS
PASCAGOULA	1004743595	IMPERIAL CUSTOMS	3305 OLD MOBILE HWY	39567	RCRA-CESQG, FINDS
PASCAGOULA	U003774073	FORMER WHITE STORE #87	1423 OLD MOBILE HWY	39567	MS UST
PASCAGOULA	90170448	1.5 MI OUT OF THE PASCAGOULA HARBOR	1.5 MI OUT OF THE PASCAGOULA HARBOR		ERNS
PASCAGOULA	99643801	PASCAGOLUA HARBOR GH BERTH: BAYOU COSSTA	PASCAGOLUA HARBOR GH BERTH: BAYOU COSSTA		ERNS
PASCAGOULA	2001565361	PASCAGOULA HARBOR	PASCAGOULA HARBOR	0	ERNS
PASCAGOULA	2000527552	PASCAGOULA AND THE BAYOU	PASCAGOULA AND THE BAYOU	0	ERNS
PASCAGOULA	99635996	PASCAGOULA HARBOR 0 MILE BOARD	PASCAGOULA HARBOR 0 MILE BOARD		ERNS
PASCAGOULA	98457830	PASCAGOULA INNER HARBOR	PASCAGOULA INNER HARBOR		ERNS
PASCAGOULA	2008861518	PASCAGOULA HARBOR	PASCAGOULA HARBOR		ERNS
PASCAGOULA	2007331219	PASCAGOULA INNER HARBOR	PASCAGOULA INNER HARBOR		ERNS
PASCAGOULA	984217621	EAST PASCAGOULA RIVER ENTRANCE TO HARBOR ON WEST BANK	EAST PASCAGOULA RIVER ENTRANCE TO HARBOR ON WEST BANK		ERNS
PASCAGOULA	984217620	EAST PASCAGOULA RIVER ENTRANCE TO HARBOR ON WEST BANK	EAST PASCAGOULA RIVER ENTRANCE TO HARBOR ON WEST BANK		ERNS
PASCAGOULA	2010934707	UNKNOWN SHEEN INCIDENT BAYOU CASOTTE HARBOR BETWEEN PUBLIC T	UNKNOWN SHEEN INCIDENT BAYOU C HBR		ERNS
PASCAGOULA	90176952	VSL. OBO HAWK BAYOU CASOTTE	VSL. OBO HAWK BAYOU CASOTTE		ERNS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 06/30/2011
Date Data Arrived at EDR: 07/12/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 79

Source: EPA
Telephone: N/A
Last EDR Contact: 10/12/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 06/30/2011
Date Data Arrived at EDR: 07/12/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 79

Source: EPA
Telephone: N/A
Last EDR Contact: 10/12/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 06/30/2011
Date Data Arrived at EDR: 07/12/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 79

Source: EPA
Telephone: N/A
Last EDR Contact: 10/12/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 02/25/2011
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 02/25/2011
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 09/09/2011
Date Data Arrived at EDR: 09/16/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/09/2011
Date Data Arrived at EDR: 03/15/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 91

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Quarterly

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/15/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/07/2011	Telephone: (404) 562-8651
Date Made Active in Reports: 08/08/2011	Last EDR Contact: 10/05/2011
Number of Days to Update: 32	Next Scheduled EDR Contact: 01/16/2012
	Data Release Frequency: Quarterly

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/15/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/07/2011	Telephone: (404) 562-8651
Date Made Active in Reports: 08/08/2011	Last EDR Contact: 10/05/2011
Number of Days to Update: 32	Next Scheduled EDR Contact: 01/16/2012
	Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 06/15/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/07/2011	Telephone: (404) 562-8651
Date Made Active in Reports: 08/08/2011	Last EDR Contact: 10/05/2011
Number of Days to Update: 32	Next Scheduled EDR Contact: 01/16/2012
	Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/15/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/07/2011	Telephone: (404) 562-8651
Date Made Active in Reports: 08/08/2011	Last EDR Contact: 10/05/2011
Number of Days to Update: 32	Next Scheduled EDR Contact: 01/16/2012
	Data Release Frequency: Varies

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 06/15/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/07/2011	Telephone: (404) 562-8651
Date Made Active in Reports: 08/08/2011	Last EDR Contact: 10/05/2011
Number of Days to Update: 32	Next Scheduled EDR Contact: 01/16/2012
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/16/2011
Date Data Arrived at EDR: 03/25/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/16/2011
Date Data Arrived at EDR: 03/25/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Varies

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 07/05/2011
Date Data Arrived at EDR: 07/05/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 86

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 10/04/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 07/05/2011
Date Data Arrived at EDR: 07/05/2011
Date Made Active in Reports: 09/30/2011
Number of Days to Update: 87

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 10/04/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Annually

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/12/2011
Date Data Arrived at EDR: 02/11/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 80

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 08/09/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Varies

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 06/08/2011	Source: Drug Enforcement Administration
Date Data Arrived at EDR: 09/16/2011	Telephone: 202-307-1000
Date Made Active in Reports: 09/29/2011	Last EDR Contact: 09/07/2011
Number of Days to Update: 13	Next Scheduled EDR Contact: 12/19/2011
	Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 06/27/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 06/27/2011	Telephone: 202-566-2777
Date Made Active in Reports: 09/13/2011	Last EDR Contact: 09/28/2011
Number of Days to Update: 78	Next Scheduled EDR Contact: 01/09/2012
	Data Release Frequency: Semi-Annually

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005	Source: USGS
Date Data Arrived at EDR: 11/10/2006	Telephone: 888-275-8747
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 10/20/2011
Number of Days to Update: 62	Next Scheduled EDR Contact: 01/30/2012
	Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2009	Source: U.S. Army Corps of Engineers
Date Data Arrived at EDR: 08/12/2010	Telephone: 202-528-4285
Date Made Active in Reports: 12/02/2010	Last EDR Contact: 09/12/2011
Number of Days to Update: 112	Next Scheduled EDR Contact: 12/26/2011
	Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005	Source: Department of the Navy
Date Data Arrived at EDR: 12/11/2006	Telephone: 843-820-7326
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 07/11/2011
Number of Days to Update: 31	Next Scheduled EDR Contact: 09/05/2011
	Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 06/01/2011	Source: Department of Justice, Consent Decree Library
Date Data Arrived at EDR: 08/19/2011	Telephone: Varies
Date Made Active in Reports: 09/29/2011	Last EDR Contact: 10/03/2011
Number of Days to Update: 41	Next Scheduled EDR Contact: 01/16/2012
	Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 07/31/2011	Source: EPA
Date Data Arrived at EDR: 09/14/2011	Telephone: 703-416-0223
Date Made Active in Reports: 09/29/2011	Last EDR Contact: 09/14/2011
Number of Days to Update: 15	Next Scheduled EDR Contact: 12/26/2011
	Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010	Source: Department of Energy
Date Data Arrived at EDR: 10/21/2010	Telephone: 505-845-0011
Date Made Active in Reports: 01/28/2011	Last EDR Contact: 08/31/2011
Number of Days to Update: 99	Next Scheduled EDR Contact: 12/12/2011
	Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009	Source: EPA, Region 9
Date Data Arrived at EDR: 05/07/2009	Telephone: 415-947-4219
Date Made Active in Reports: 09/21/2009	Last EDR Contact: 09/26/2011
Number of Days to Update: 137	Next Scheduled EDR Contact: 01/09/2012
	Data Release Frequency: No Update Planned

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985	Source: Environmental Protection Agency
Date Data Arrived at EDR: 08/09/2004	Telephone: 800-424-9346
Date Made Active in Reports: 09/17/2004	Last EDR Contact: 06/09/2004
Number of Days to Update: 39	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/18/2011	Source: Department of Labor, Mine Safety and Health Administration
Date Data Arrived at EDR: 09/08/2011	Telephone: 303-231-5959
Date Made Active in Reports: 09/29/2011	Last EDR Contact: 09/08/2011
Number of Days to Update: 21	Next Scheduled EDR Contact: 12/19/2011
	Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/17/2010
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 94

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 09/27/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007	Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007	Last EDR Contact: 12/17/2008
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/17/2008
	Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009	Source: EPA
Date Data Arrived at EDR: 12/10/2010	Telephone: 202-564-4203
Date Made Active in Reports: 02/25/2011	Last EDR Contact: 10/31/2011
Number of Days to Update: 77	Next Scheduled EDR Contact: 02/13/2012
	Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/07/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/21/2011	Telephone: 202-564-5088
Date Made Active in Reports: 03/21/2011	Last EDR Contact: 09/26/2011
Number of Days to Update: 59	Next Scheduled EDR Contact: 01/09/2012
	Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB’s who are required to notify the EPA of such activities.

Date of Government Version: 11/01/2010	Source: EPA
Date Data Arrived at EDR: 11/10/2010	Telephone: 202-566-0500
Date Made Active in Reports: 02/16/2011	Last EDR Contact: 10/19/2011
Number of Days to Update: 98	Next Scheduled EDR Contact: 01/30/2012
	Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 06/21/2011	Source: Nuclear Regulatory Commission
Date Data Arrived at EDR: 07/15/2011	Telephone: 301-415-7169
Date Made Active in Reports: 09/13/2011	Last EDR Contact: 09/12/2011
Number of Days to Update: 60	Next Scheduled EDR Contact: 12/26/2011
	Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/11/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/13/2011	Telephone: 202-343-9775
Date Made Active in Reports: 02/16/2011	Last EDR Contact: 10/13/2011
Number of Days to Update: 34	Next Scheduled EDR Contact: 01/23/2012
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/14/2010
Date Data Arrived at EDR: 04/16/2010
Date Made Active in Reports: 05/27/2010
Number of Days to Update: 41

Source: EPA
Telephone: (404) 562-9900
Last EDR Contact: 09/13/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Biennially

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 10/18/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 10/17/2011
Next Scheduled EDR Contact: 01/30/2012
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing
The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 10/24/2011
Next Scheduled EDR Contact: 02/06/2012
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 01/01/2008
Date Data Arrived at EDR: 02/18/2009
Date Made Active in Reports: 05/29/2009
Number of Days to Update: 100

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 10/19/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 08/17/2010
Date Data Arrived at EDR: 01/03/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 09/16/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Varies

FEDERAL FACILITY: Federal Facility Site Information listing
A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPAa??s Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 12/10/2010
Date Data Arrived at EDR: 01/11/2011
Date Made Active in Reports: 02/16/2011
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 10/14/2011
Next Scheduled EDR Contact: 01/23/2012
Data Release Frequency: Varies

STATE AND LOCAL RECORDS

SHWS: CERCLA/Uncontrolled Sites File List
State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 09/06/2011
Date Data Arrived at EDR: 10/04/2011
Date Made Active in Reports: 10/26/2011
Number of Days to Update: 22

Source: Department of Environmental Quality
Telephone: 601-961-5666
Last EDR Contact: 10/04/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SWF/LF: Solid Waste Landfills

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/01/2011
Date Data Arrived at EDR: 06/01/2011
Date Made Active in Reports: 07/13/2011
Number of Days to Update: 42

Source: Department of Environmental Quality
Telephone: 601-961-5082
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Semi-Annually

DEBRIS: Debris Site Locations Listing

A listing of Hurricane Katrina debris disposal site locations. Not all of these sites were approved or utilized. Please note that the list includes a number of different types of sites including vegetative debris burn, chip, staging and disposal sites as well as structural debris staging and disposal sites.

Date of Government Version: 06/17/2008
Date Data Arrived at EDR: 06/17/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 44

Source: Department of Environmental Quality
Telephone: 601-961-5726
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

UIC: UIC Information

A listing of underground injection cotrol wells.

Date of Government Version: 09/20/2011
Date Data Arrived at EDR: 09/21/2011
Date Made Active in Reports: 10/26/2011
Number of Days to Update: 35

Source: State Oil & Gas Board
Telephone: 601-576-4923
Last EDR Contact: 09/21/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SWTIRE: Commercial Waste Tire Haulers

A listing of commercial waste tire haulers.

Date of Government Version: 09/14/2011
Date Data Arrived at EDR: 09/16/2011
Date Made Active in Reports: 10/26/2011
Number of Days to Update: 40

Source: Department of Environmental Quality
Telephone: 601-961-5726
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Quarterly

SWRCY: Mississippi Recycling Directory

A listing of recycling facilities.

Date of Government Version: 11/01/2007
Date Data Arrived at EDR: 01/10/2008
Date Made Active in Reports: 01/22/2008
Number of Days to Update: 12

Source: Department of Environmental Quality
Telephone: 601-961-5005
Last EDR Contact: 09/01/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Varies

LUST: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 10/04/2011
Date Data Arrived at EDR: 10/05/2011
Date Made Active in Reports: 10/28/2011
Number of Days to Update: 23

Source: Department of Environmental Quality
Telephone: 601-961-5058
Last EDR Contact: 10/05/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UST: Underground Storage Tanks

Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 10/04/2011
Date Data Arrived at EDR: 10/05/2011
Date Made Active in Reports: 10/26/2011
Number of Days to Update: 21

Source: Department of Environmental Quality
Telephone: 601-961-5058
Last EDR Contact: 10/05/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Quarterly

PERMITS: Environmental Site Information System Listing

The purpose of this system is to support the permitting and compliance activities of the Office of Pollution Control. Regulatory programs that are supported by this database are the Surface Water National Pollutant Discharge Elimination System (NPDES) Program; the Air Title V, Construction and Operating Programs; and the Solid and Hazardous Waste Programs.

Date of Government Version: 08/15/2011
Date Data Arrived at EDR: 08/15/2011
Date Made Active in Reports: 09/23/2011
Number of Days to Update: 39

Source: The Office of Pollution Control
Telephone: 601-961-5670
Last EDR Contact: 08/22/2011
Next Scheduled EDR Contact: 12/05/2011
Data Release Frequency: Quarterly

AST: Aboveground Storage Tanks

Aboveground storage tanks regulated by the Department of Agriculture & Commerce. The tanks contents will be gasoline, diesel, racing fuel or kerosene.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/16/2011
Date Made Active in Reports: 10/26/2011
Number of Days to Update: 40

Source: Department of Agriculture & Commerce
Telephone: 601-359-1101
Last EDR Contact: 08/31/2011
Next Scheduled EDR Contact: 12/12/2011
Data Release Frequency: Semi-Annually

ENG CONTROLS: Sites with Engineering Controls

Sites included on the CERCLA/Uncontrolled Sites File List that have Engineering Controls. Engineering Controls encompass a variety of engineered remedies to contain and/or reduce contamination, and/or physical barriers intended to limit access to property. ECs include fences, signs, guards, landfill caps, provision of potable water, slurry walls, sheet pile (vertical caps), pumping and treatment of groundwater, monitoring wells, and vapor extraction systems

Date of Government Version: 09/06/2011
Date Data Arrived at EDR: 10/04/2011
Date Made Active in Reports: 10/26/2011
Number of Days to Update: 22

Source: Department of Environmental Quality
Telephone: 601-961-5666
Last EDR Contact: 10/04/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Quarterly

INST CONTROL: Sites with Institutional Controls

Sites included on the CERCLA/Uncontrolled Sites File List that have Institutional Controls. Institutional Controls are non-engineered instruments, such as administrative and/or legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of a remedy by limiting land or resource use

Date of Government Version: 09/06/2011
Date Data Arrived at EDR: 10/04/2011
Date Made Active in Reports: 10/26/2011
Number of Days to Update: 22

Source: Department of Environmental Quality
Telephone: 601-961-5666
Last EDR Contact: 10/04/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Quarterly

VCP: Voluntary Evaluation Program Sites

The Voluntary Evaluation Program allows accepted parties the opportunity to participate in a program that will expedite the evaluation of the site information.

Date of Government Version: 09/06/2011	Source: Department of Environmental Quality
Date Data Arrived at EDR: 10/04/2011	Telephone: 601-961-5063
Date Made Active in Reports: 10/26/2011	Last EDR Contact: 10/04/2011
Number of Days to Update: 22	Next Scheduled EDR Contact: 01/16/2012
	Data Release Frequency: Varies

DRYCLEANERS: Drycleaner Facilities Listing
A listing of drycleaner facilities.

Date of Government Version: 06/08/2009	Source: Department of Environmental Quality
Date Data Arrived at EDR: 06/09/2009	Telephone: 601-961-5670
Date Made Active in Reports: 07/02/2009	Last EDR Contact: 08/22/2011
Number of Days to Update: 23	Next Scheduled EDR Contact: 12/05/2011
	Data Release Frequency: Varies

BROWNFIELDS: Uncontrolled Sites List
A listing of sites from the Uncontrolled Sites List that are currently in the Mississippi Brownfields Program (which means that they are pursuing liability protection and paying for MDEQ oversight costs).

Date of Government Version: 09/06/2011	Source: Department of Environmental Quality
Date Data Arrived at EDR: 10/04/2011	Telephone: 601-961-5666
Date Made Active in Reports: 10/26/2011	Last EDR Contact: 10/04/2011
Number of Days to Update: 22	Next Scheduled EDR Contact: 01/16/2012
	Data Release Frequency: Varies

NPDES: Industrial & Municipal NPDES Facilities
Water discharge permit data.

Date of Government Version: 08/15/2011	Source: Department of Environmental Quality
Date Data Arrived at EDR: 08/15/2011	Telephone: 601-961-5666
Date Made Active in Reports: 09/23/2011	Last EDR Contact: 08/22/2011
Number of Days to Update: 39	Next Scheduled EDR Contact: 12/05/2011
	Data Release Frequency: Quarterly

ASBESTOS: Asbestos Project Listing
A listing of Air Division Asbestos Branch projects.

Date of Government Version: 09/14/2011	Source: Department of Environmental Quality
Date Data Arrived at EDR: 09/15/2011	Telephone: 601-961-5164
Date Made Active in Reports: 10/25/2011	Last EDR Contact: 10/31/2011
Number of Days to Update: 40	Next Scheduled EDR Contact: 01/16/2012
	Data Release Frequency: Varies

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005	Source: USGS
Date Data Arrived at EDR: 12/08/2006	Telephone: 202-208-3710
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 10/20/2011
Number of Days to Update: 34	Next Scheduled EDR Contact: 01/30/2012
	Data Release Frequency: Semi-Annually

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/03/2007	Telephone: 703-308-8245
Date Made Active in Reports: 01/24/2008	Last EDR Contact: 08/08/2011
Number of Days to Update: 52	Next Scheduled EDR Contact: 11/21/2011
	Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 05/10/2011
Date Data Arrived at EDR: 05/11/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 34

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 08/11/2011
Date Data Arrived at EDR: 08/12/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 32

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Semi-Annually

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/18/2011
Date Data Arrived at EDR: 08/19/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 25

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 08/04/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 39

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 02/16/2011
Date Data Arrived at EDR: 06/02/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 103

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/31/2011
Date Data Arrived at EDR: 02/01/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 48

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 05/05/2011
Date Data Arrived at EDR: 08/02/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 42

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 11/01/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 08/04/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 39

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 08/18/2011
Date Data Arrived at EDR: 08/19/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 25

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 08/04/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 39

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Quarterly

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 08/11/2011
Date Data Arrived at EDR: 08/12/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 32

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Semi-Annually

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/10/2011
Date Data Arrived at EDR: 05/11/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 34

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 07/01/2011
Date Data Arrived at EDR: 08/26/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 18

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/01/2011
Date Data Arrived at EDR: 06/01/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 13

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 05/05/2011
Date Data Arrived at EDR: 08/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 36

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 10/31/2011
Next Scheduled EDR Contact: 02/13/2012
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 05/05/2011
Date Data Arrived at EDR: 07/05/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 70

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 10/04/2011
Next Scheduled EDR Contact: 01/16/2012
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 08/01/2011
Date Data Arrived at EDR: 08/09/2011
Date Made Active in Reports: 09/16/2011
Number of Days to Update: 38

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 08/09/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 12/01/2009
Date Made Active in Reports: 12/14/2009
Number of Days to Update: 13

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Child Care Listing
Source: Department of Health
Telephone: 601-576-7613

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION

Appendix D

Agency Correspondence

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

April 15, 2011

Coastal Branch
Regulatory Division

JOINT PUBLIC NOTICE SAM-2011-00389-PAH
U.S. ARMY CORPS OF ENGINEERS

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF POLLUTION CONTROL

MISSISSIPPI DEPARTMENT OF MARINE RESOURCES

PROPOSED IMPACTS TO OPEN WATER ASSOCIATED WITH THE EXPANSION OF THE BAYOU CASOTTE CHANNEL AND LOWER MISSISSIPPI SOUND CHANNEL BY THE JACKSON COUNTY PORT AUTHORITY, PASCAGOULA, JACKSON COUNTY, MISSISSIPPI

TO WHOM IT MAY CONCERN:

This District has received an application for a Department of the Army permit pursuant to Section 10 of the River and Harbors Act of 1899 and Section 103 of the Marine Protection, Research and Sanctuaries Act. Please communicate this information to interested parties.

APPLICANT: Jackson County Port Authority
Attention: Mr. Allen Moeller
Post Office Box 70
Pascagoula, Mississippi 39568

WATERWAY: In Mississippi Sound, Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365 North, Longitude 88.556 West).

WORK: The project as proposed is to widen the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment 100 feet on the west side parallel to the existing channel centerline to the existing depth of -42 feet mean high tide. The improved channel length would be approximately 38,137 feet (7.22 miles) long. New work dredging quantity estimates are approximately 3.35 million cubic yards. One-on-five channel side slopes are being used for the project condition as in the existing condition. With channel modification, some U.S. Coast Guard channel beacons and markers would require relocation.

The new work material would be dredged with combinations of hopper, hydraulic pipeline and/or mechanical type dredges. It is anticipated that most of the material associated with the channel improvement measures would be hydraulically excavated. Preliminary results indicate that a small portion of the material is sand and could suitable for beneficial use. Therefore, this material could be placed in the littoral zone disposal area, located southeast of the east end of Horn Island. The remaining material will be placed in the U.S. Environmental Protection Agency's (EPA) designated Pascagoula Ocean Dredged Material Disposal Area.

Dredging associated with the work could temporarily impact open water habitat. Dredging could increase sedimentation and turbidity in the immediate vicinity of the operations, potentially resulting in short-term impacts on fish and other biological resources in the area. Increased sedimentation and turbidity due to the dredging activities would be temporary, and suspended sediments would likely return to background levels in a short time after and a short distance from the point of disturbance. There are no wetlands impacts known to exist at the proposed dredge disposal site.

The applicant stated that environmental laws and regulations will be followed during dredging, disposal and material management operations. The applicant stated the use of best management procedures would be incorporated during the handling of dredged sediment to reduce impacts on water quality.

EXISTING CONDITIONS: The proposed channel dredging and expansion is located in Bayou Casotte and the Lower Pascagoula Channel portions of Mississippi Sound in the southeastern most portion of the state along the Gulf of Mexico. Mississippi Sound is a shallow estuary approximately 80 miles long by 9 miles wide which is separated from the Gulf of Mexico by a chain of barrier islands. Mississippi Sound has an average water depth of 10 feet, with over 99 percent of Mississippi Sound is less than 20 feet deep. The Port of Pascagoula is accessible from the Gulf of Mexico by a shipping channel located through the pass between Horn Island and Petit Bois Island in Mississippi Sound. The Horn Island Pass sea buoy marks the entrance to this channel at 30 degrees 11 minutes north and 88 degrees 3 minutes west. The channel proceeds northward crossing the Gulf Intracoastal Waterway (GIWW). Just north of the GIWW the channel splits into an eastern and western fork which leads to Bayou Casotte Harbor and the Pascagoula River Harbor, respectively.

PROJECT PURPOSE: The applicant stated the following for their project purpose and need: "The measures proposed would widen the channel north of Petit Bois island to the turning basin located at the mouth of Bayou Casotte. These measures would help to alleviate the current transiting restrictions by providing increased opportunities for vessel transit along with a potential increase in the maximum speed a vessel is allowed to transit, provide improved conditions for vessel operations, provide improved conditions for port operations, and if possible, provide improved habitat conditions through beneficial use of dredged material."

The U.S. Army Corps of Engineers (Corps) initially determined the basic project purpose is for the expansion of an existing ship navigation channel and would be considered a water dependent activity.

ALTERNATIVES: The applicant stated alternatives to the proposed action will be considered. Additional evaluation of alternatives regarding the project as proposed would be evaluated throughout the Environmental Impact Statement review process by the Corps and cooperating agencies.

MITIGATION: The applicant has not provided any mitigation details at this time.

Final compensatory mitigation will be evaluated by the Corps and cooperating resource agencies throughout the review process for the proposed project.

The applicant has applied for certification from the State of Mississippi in accordance with Section 401(a) (1) of the Clean Water Act and upon completion of the required advertising, a determination relative to certification will be made.

The applicant has applied for coastal zone consistency from the State of Mississippi Department of Marine Resources in accordance with Section 57-15-6 of the Mississippi Code Annotated.

This public notice is being distributed to all known interested persons in order to assist in developing facts on which a decision by the Corps can be based. For accuracy and completeness of the record, all data in support of or in opposition to the proposed work should be submitted in writing setting forth sufficient detail to furnish a clear understanding of the reasons for support or opposition. The decision whether to issue a permit will be based on an evaluation of the probable impact, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources.

The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered, including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, protected species, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food production and in general, the needs and welfare of the people.

The Corps is soliciting comments from the public; Federal, State and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity. Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held for consideration of this application. Requests for public hearings shall state with particularity, the reasons for holding a public hearing.

Evaluation of the probable impacts involving deposits of dredged or fill material into waters of the United States will include the application of guidelines established by the Administrator of the EPA.

The National Register of Historic Places (NRHP) will be consulted for properties listed in or eligible for the National Register which would be affected by the proposed work. Copies of this notice are being sent to the State Historic Preservation Officer (SHPO) and the U.S. Department of the Interior, National Park Service, Division of Archeological Services for further consultation and comments. Previous investigations for the facility have determined that no properties are listed in or eligible for listing in the

NRHP. In accordance with Appendix C of 33 CFR Part 325, the Corps has determined that the permit area is the full area of development for the overall project footprint. **The Corps will consult with in-house expertise and if needed SHPO to make a final determination based upon this review unless comment to this notice is received documenting that significant sites or properties exist which may be affected by this work or that adequately documents that a potential exists for the location of significant sites or properties within the permit area.**

Preliminary review of this application and the U.S. Department of the Interior List of Endangered and Threatened Wildlife and Plants indicate the proposed activity **will require additional evaluation** on the species, Gulf Sturgeon. Further evaluation will be performed to determine the potential impact to critical habitat and/or additional species. The National Marine Fisheries Service (NMFS) requires the evaluation of impacts to Essential Fish Habitat (EFH) of estuarine species. This notice initiates the EFH **informal consultation notification** of the Magnuson-Stevens Fishery Conservation and Management Act. Further coordination with the NMFS and the U.S. Fish and Wildlife Service (FWS) will be performed on the proposed project. **Formal consultation with both the NMFS and the FWS may be required as additional information is gathered and coordination is performed.**

Correspondence concerning this Public Notice should refer to Public Notice Number **SAM-2011-00389-PAH,** and should be directed to the District Engineer, U.S. Army Engineer District, Mobile, Attention: **Mr. Philip A. Hegji**, Post Office Box 2288, Mobile, Alabama 36628-0001, Attention: Coastal Branch, with a copy to the Mississippi Department of Environmental Quality, Office of Pollution Control, **Attention: Ms. Florance Watson, P.E.**, Post Office Box 2261, Jackson, Mississippi 39225 and the Mississippi Department of Marine Resources, **Attention: Mr. Ron Cole**, 1141 Bayview Avenue, Suite 101, Biloxi, Mississippi 39530, in time to be received within **30 days** of the date of this public notice.

If you have any questions concerning this publication, you may contact the project manager for this application, **Mr. Hegji** (philip.a.hegji@usace.army.mil), **(251) 690-3222**. Please refer to the above Public Notice number.

For additional information about our Regulatory Program, please visit our web site at: www.sam.usace.army.mil/rd/reg and please take a moment to complete our customer satisfaction survey while you're there. Your responses are appreciated and will allow us to improve our services.

MOBILE DISTRICT
U.S. Army Corps of Engineers

Enclosures

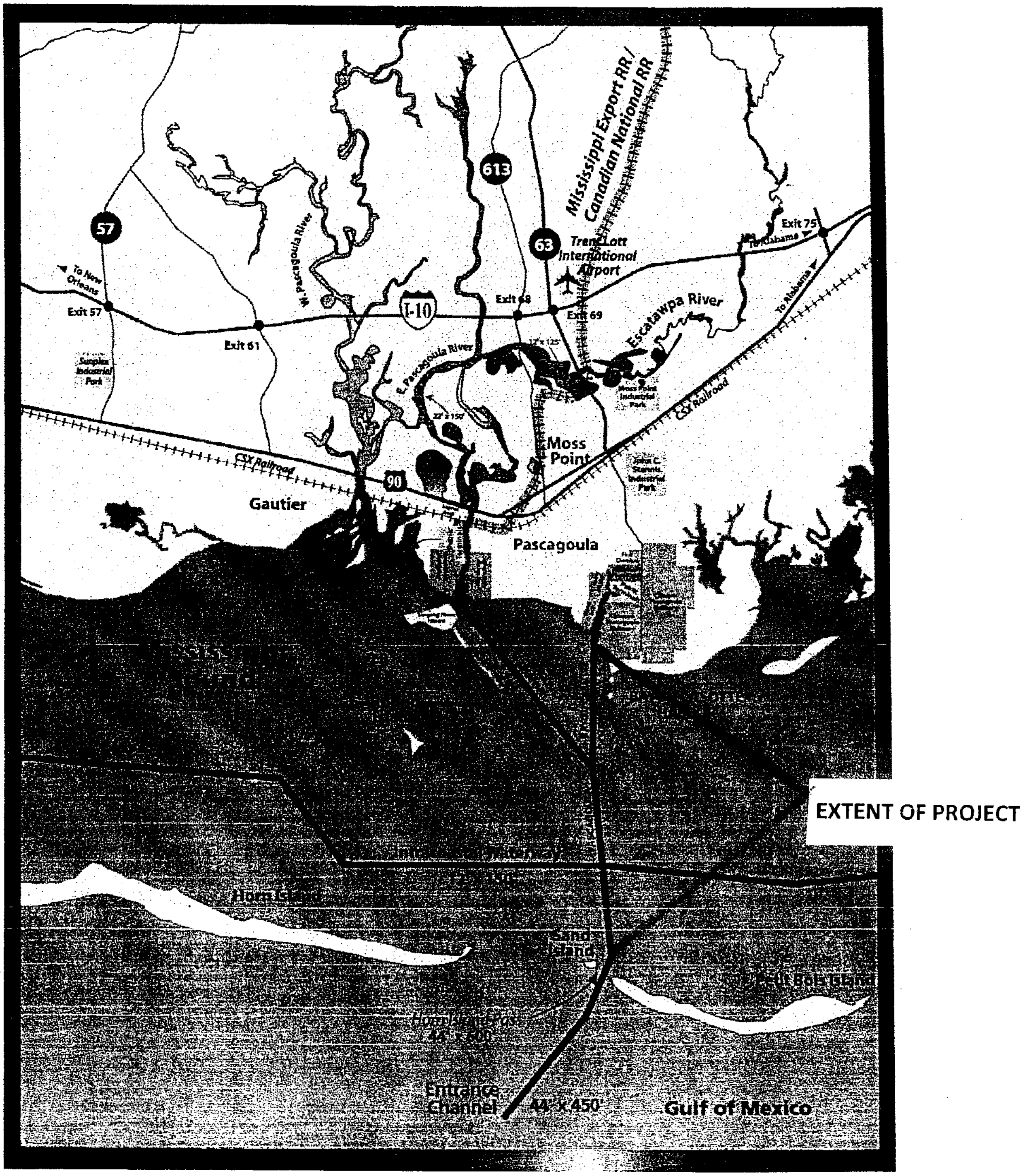
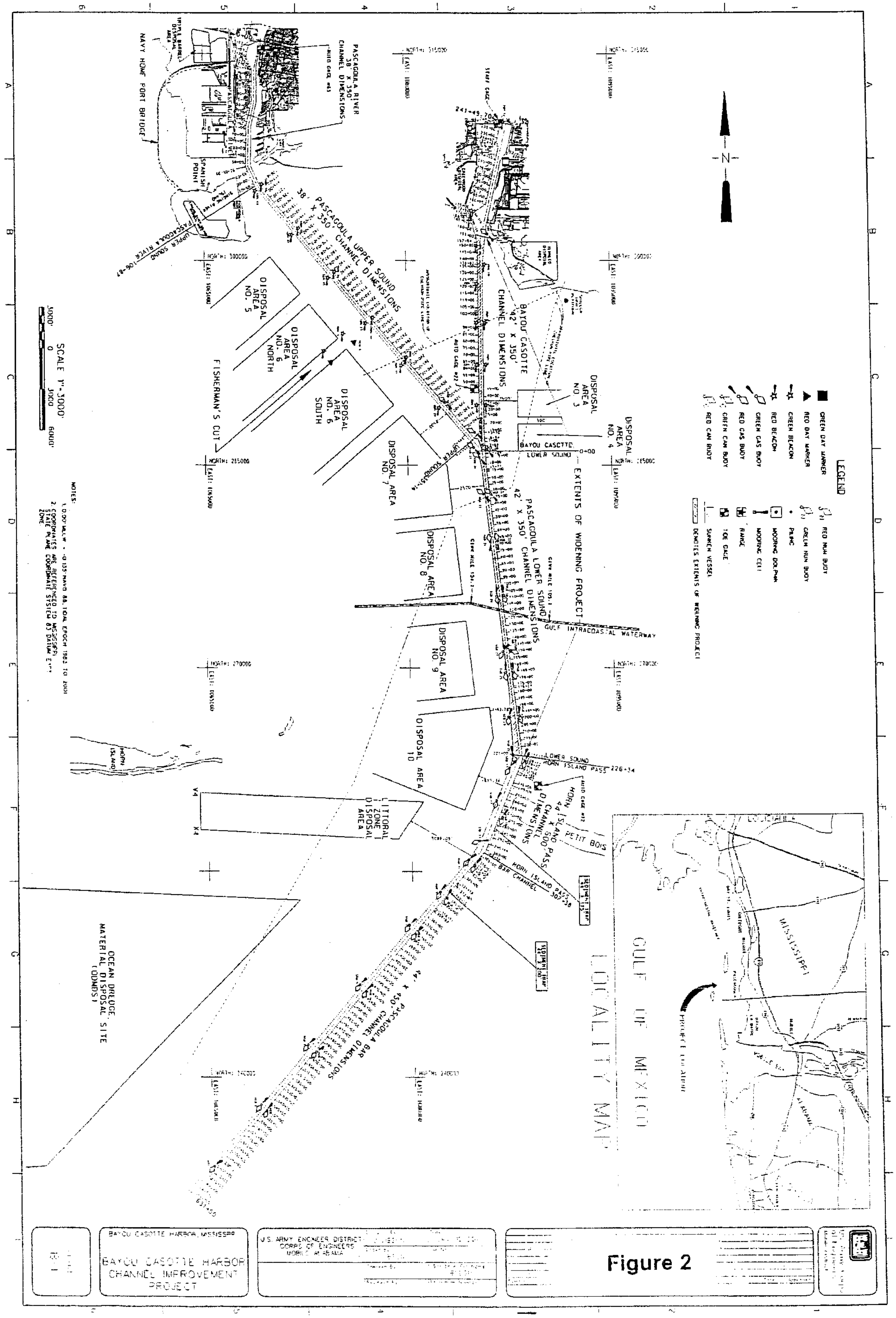


Figure 1: Vicinity Map


LEGEND
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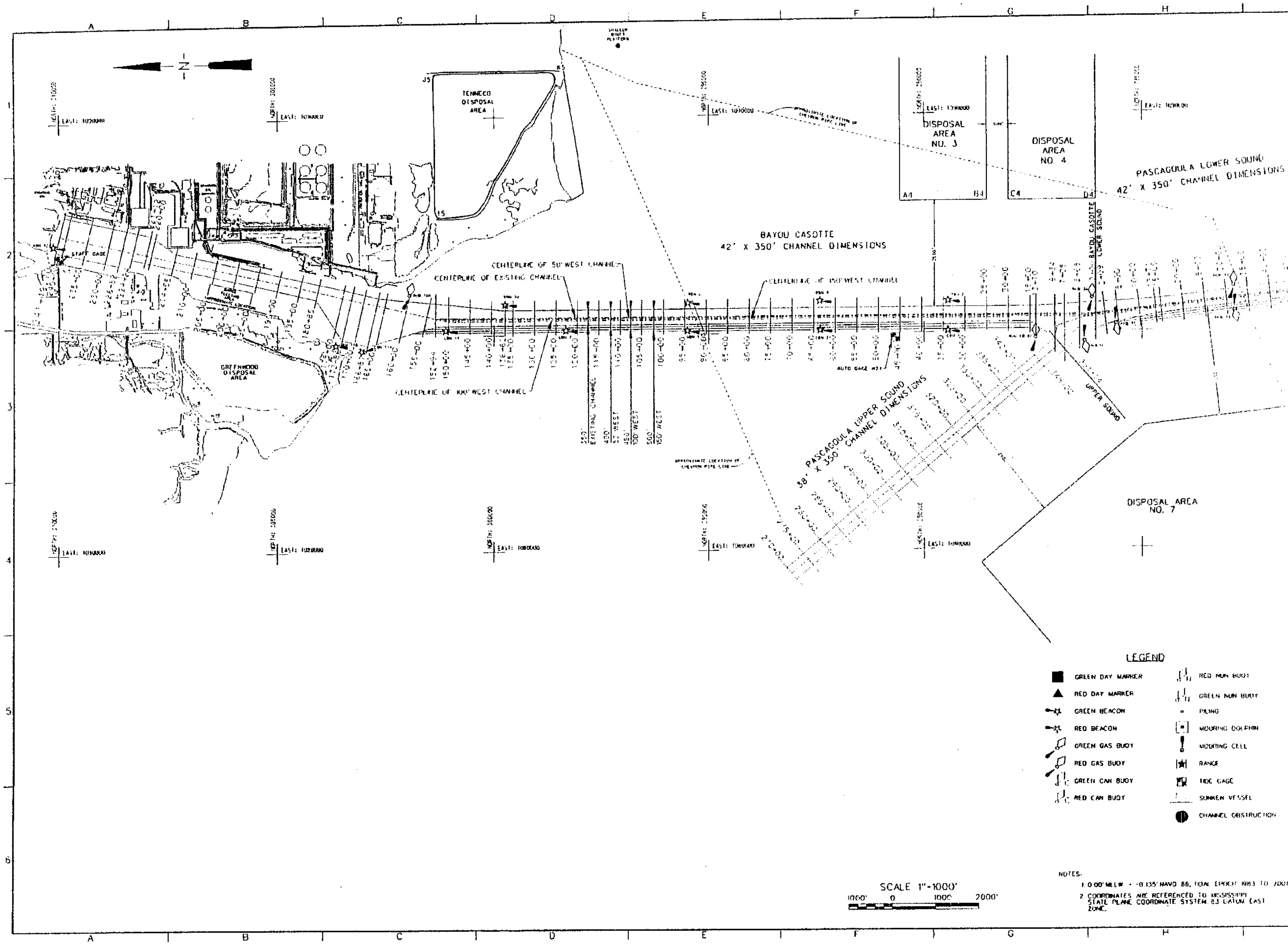
RED NUN BUOY
GREEN NUN BUOY
PILING
MOORING DOLPHIN
MOORING CELL
RANGE
TIDE GAGE
SUNKEN VESSEL
DENOTES EXTENTS OF WIDENING PROJECT
PASCAGOULA RIVER 38' X 350' CHANNEL DIMENSIONS
NAVY HOME PORT BRIDGE
SPANISH POINT
38' X 350' PASCAGOULA UPPER SOUND CHANNEL DIMENSIONS
BAYOU CASOTTE 42' X 350' CHANNEL DIMENSIONS
DISPOSAL AREA NO. 3
DISPOSAL AREA NO. 4
DISPOSAL AREA NO. 5
DISPOSAL AREA NO. 6 NORTH
DISPOSAL AREA NO. 6 SOUTH
DISPOSAL AREA NO. 7
DISPOSAL AREA NO. 8
DISPOSAL AREA NO. 9
DISPOSAL AREA 10
FISHERMAN'S CUT
EXTENTS OF WIDENING PROJECT
PASCAGOULA LOWER SOUND 42' X 350' CHANNEL DIMENSIONS
GULF INTRACOASTAL WATERWAY
SCALE 1"=3000'
LOWER SOUND
HORN ISLAND PASS
HORN ISLAND
HORN ISLAND PASS 49' X 600' CHANNEL DIMENSIONS
PETIT BOIS
BAR CHANNEL
LITTORAL ZONE 1 DISPOSAL AREA
44' X 450' PASCAGOULA BAR CHANNEL DIMENSIONS
OCEAN DREDGE MATERIAL DISPOSAL SITE (ODMDS)
GULF OF MEXICO
LOCALITY MAP
MISSISSIPPI
PROJECT LOCATION
BAYOU CASOTTE HARBOR, MISSISSIPPI
BAYOU CASOTTE HARBOR CHANNEL IMPROVEMENT PROJECT
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA

Figure 2

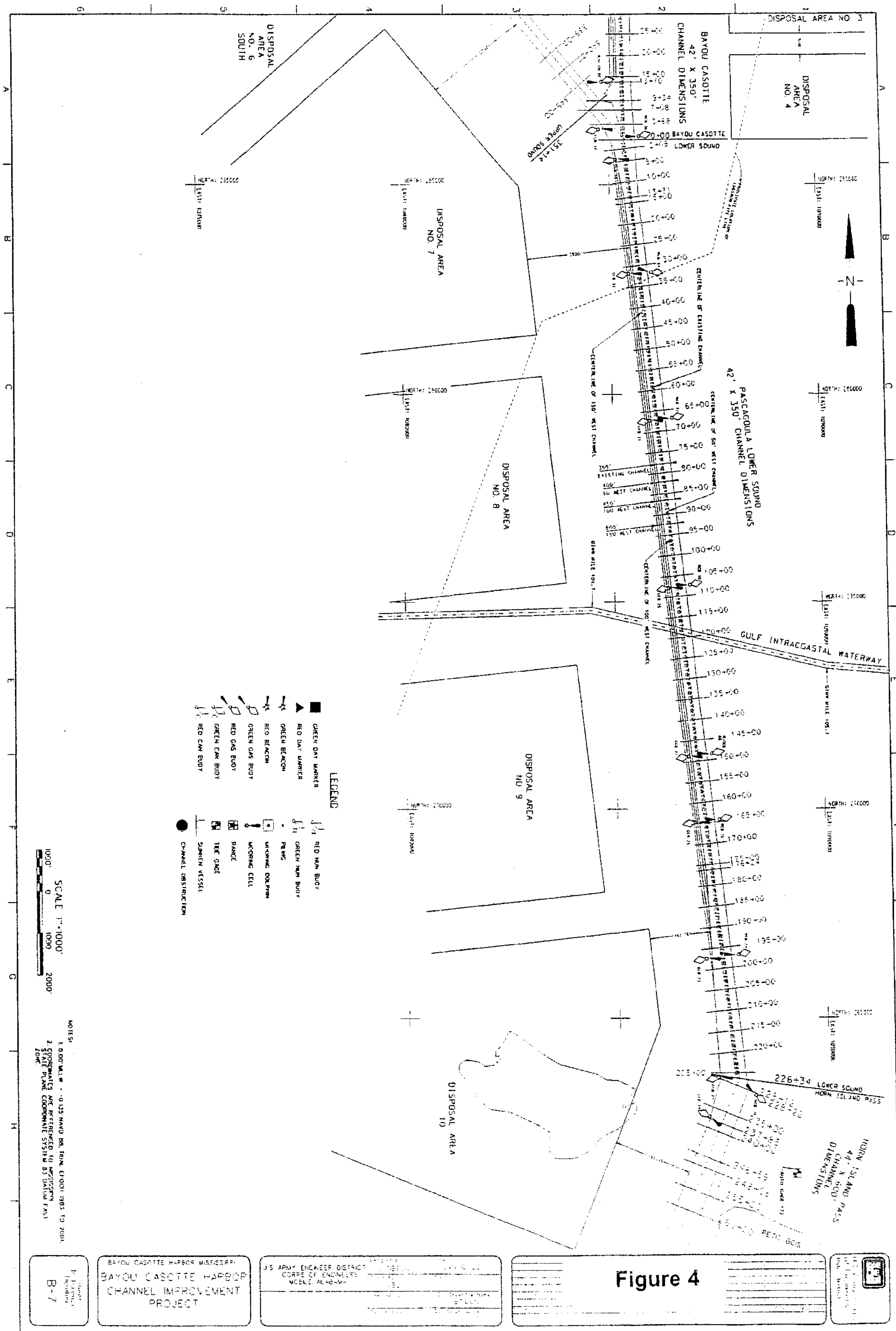


U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA

BAYOU CASOTTE HARBOR, MISSISSIPPI
BAYOU CASOTTE HARBOR
CHANNEL IMPROVEMENT
PROJECT

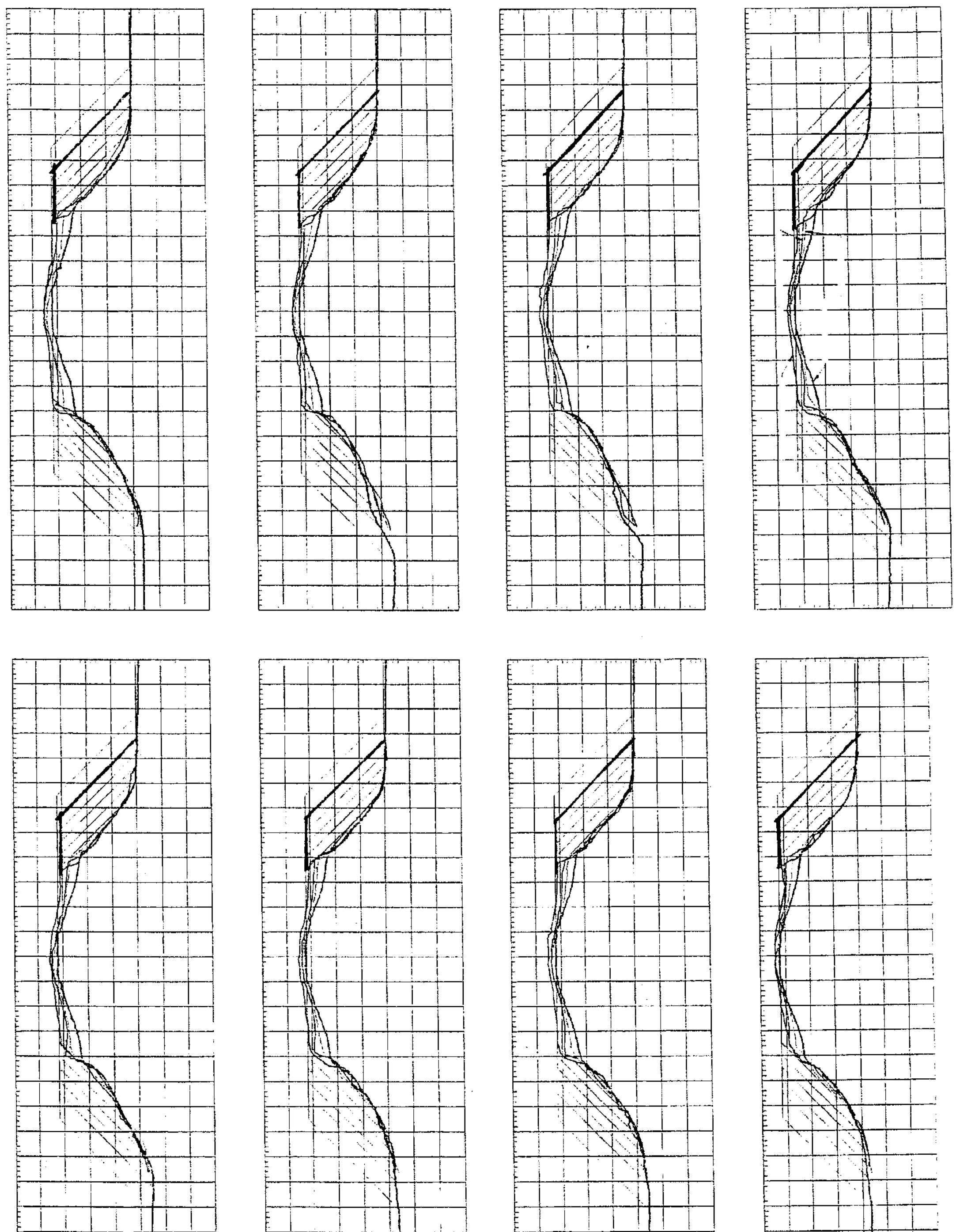
B-6

Figure 3



DISPOSAL AREA NO. 3
DISPOSAL AREA NO. 4
BAYOU CASOTTE 42' X 350' CHANNEL DIMENSIONS
BAYOU CASOTTE
LOWER SOUND
UPPER SOUND
DISPOSAL AREA NO. 6 SOUTH
DISPOSAL AREA NO. 7
-N-
PASCAGOULA LOWER SOUND 42' X 350' CHANNEL DIMENSIONS
DISPOSAL AREA NO. 8
GULF INTRACOASTAL WATERWAY
DISPOSAL AREA NO. 9
DISPOSAL AREA 10
226+34 LOWER SOUND HORN ISLAND PASS
HORN ISLAND PASS 44' X 600' CHANNEL DIMENSIONS
LEGEND
GREEN DAY MARKER
RED DAY MARKER
GREEN BEACON
RED BEACON
GREEN GAS BUOY
RED GAS BUOY
GREEN CAN BUOY
RED CAN BUOY
RED NUN BUOY
GREEN NUN BUOY
PILING
MOORING DOLPHIN
MOORING CELL
RANGE
TIDE GAGE
SUNKEN VESSEL
CHANNEL OBSTRUCTION
SCALE 1"=1000'
1000' 0 1000 2000'
NOTES:
BAYOU CASOTTE HARBOR MISSISSIPPI
BAYOU CASOTTE HARBOR CHANNEL IMPROVEMENT PROJECT
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA
B-7

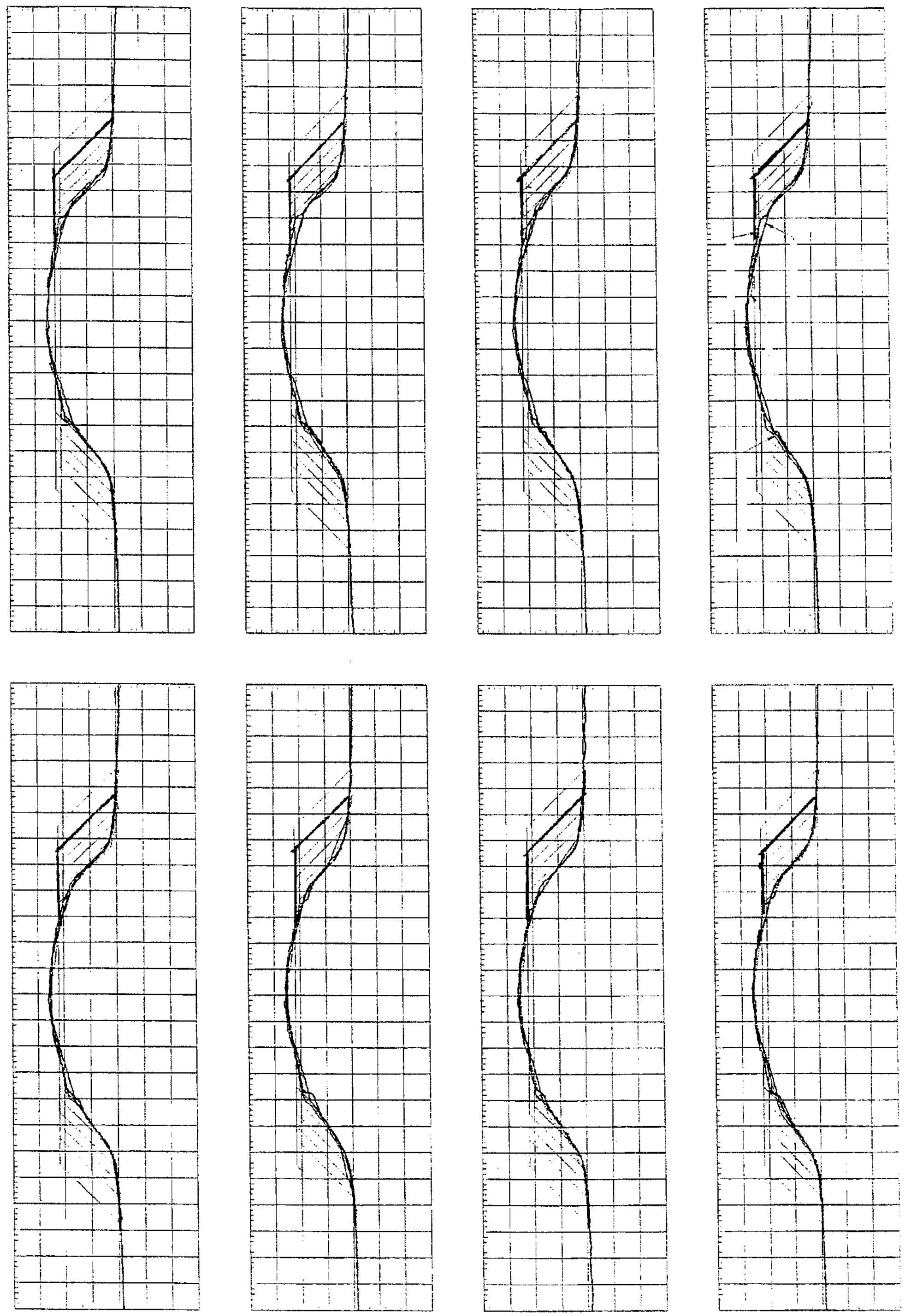
Figure 4



Sheet Reference Number 3 OF 6	PASCAGOULA HARBOR, MISSISSIPPI PROPOSED WIDENING BAYOU CASOTTE CROSS SECTIONS	U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA	Designed By: J. GIBSON Drawn By: J. GIBSON Checked By: Reviewed By: M. MCKOWN
			Date: FEB. 2, 2010 Code Code: CH108971 U.S. Sheet File Name: BCGSH3.DGN Solicitation Number:

Figure 5

US Army Corps of Engineers
Mobile District



3 OF 6	PASCAGOULA HARBOR, MISSISSIPPI PROPOSED WIDENING PASCAGOULA LOWER CROSS SECTIONS	U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA	Designed By: J. GIBSON Drawn By: J. GIBSON Checked By: Reviewed By: M. MCKOWN
			Date: FEB. 2, 2010 Code: CH105971 File Name: PLGGSH3.DGN Solicitation Number:

Figure 6

US Army Corps of Engineers
Mobile District

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, AL 36628-0001

REPLY TO
ATTENTION OF

18 April 2011

Inland Environment Team
Planning and Environmental Division

SUBJECT: Mr. Greg Williamson, Section 106 Review and Compliance

Mr. H.T. Holmes
State Historic Preservation Officer
Mississippi Department of Archives & History
Post Office Box 571
Jackson, Mississippi 39205-0571

Dear Mr. Holmes:

The U.S. Army Corps of Engineers (Corps), Mobile District is proposing to permit and/or sponsor widening portions of the Pascagoula Harbor Navigation Channel (PHNC) by dredging (Enclosure 1). The project would include segments of the Lower PHNC and Bayou Casotte Channel. The dredging project is proposed to improve navigation for continued channel operation and maintenance. The PHNC is located within the waters of the Mississippi Sound and Pascagoula River delta, Jackson County, in southeastern Mississippi. The action is being reviewed concurrently by the Mobile District Planning Division as part of a study investigation and by Regulatory Division under the Corps Permitting number (SAM-2011-00389-PAH).

As per requirements outlined in Section 106 of the National Historic Preservation Act, the Corps must consider the effects of the proposed action on historic properties. The Pascagoula Harbor and the PHNC were previously surveyed for cultural resources in anticipation of the 1986 improvement project (Mistovich et al. 1983). In addition to the previous survey work, a complete records and historic background study of the project area was conducted by CH2MHill in June, 2007. No historic properties were located within the area of potential effect (APE) of the previously proposed actions and the Corps determined no historic properties affected by those actions.

The currently proposed expansion of the Bayou Casotte and the Lower PHNC includes areas previously surveyed, but not considered within the dredging project APE. The proposed expanded APE includes several archaeological sites including the Big and Little Greenwood Island sites (22JA516 and 22JA618) and a post-Mexican War hospital and cemetery associated with Camp Jefferson Davis [see "*Archaeological Survey and Testing of Greenwood Island and the Bayou Casotte Proposed Port Facilities, Jackson County, Mississippi*" (Solis and Walling 1982) among others].

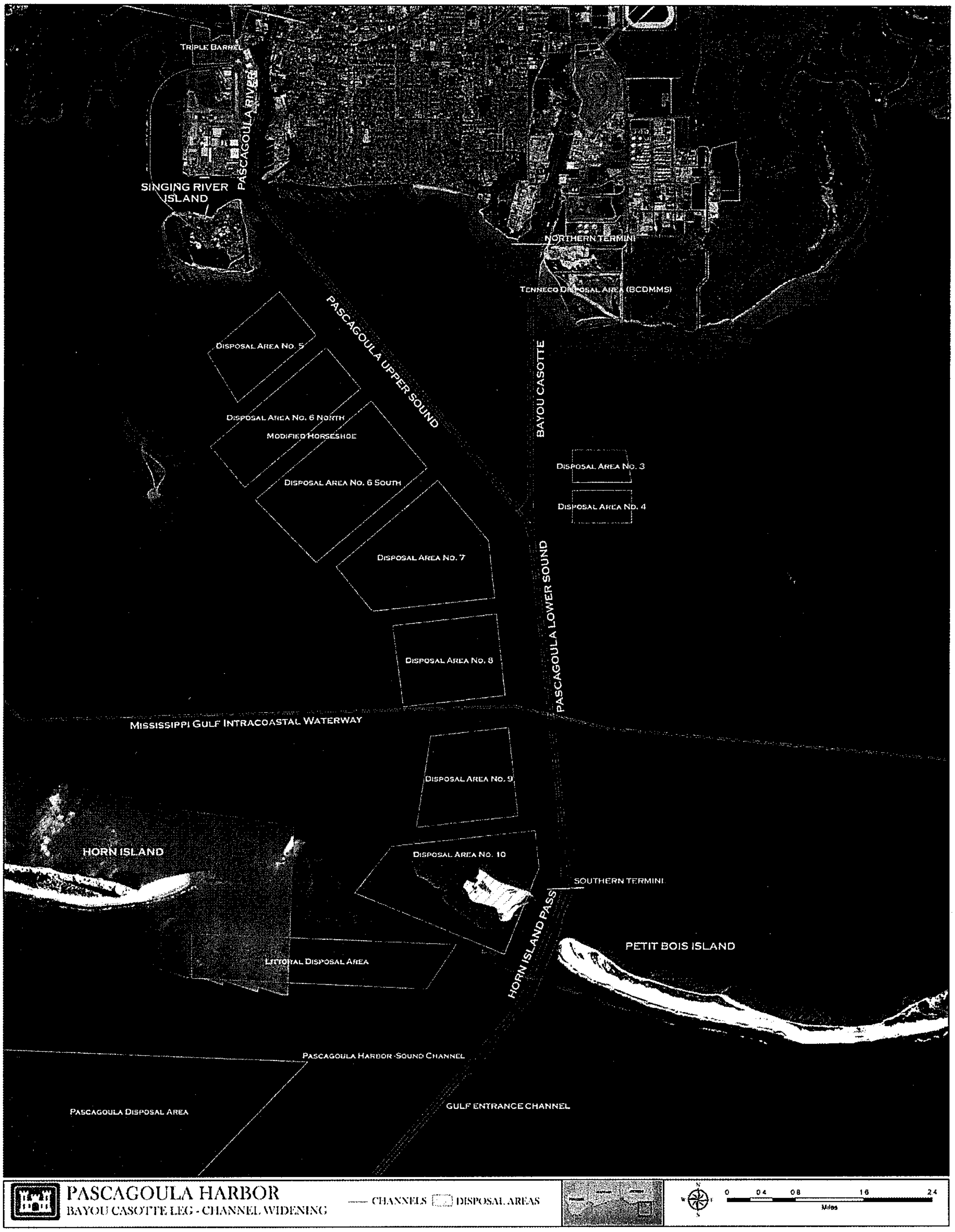
This letter is sent as an initiation of consultation and invitation to your office to participate in the design of possible survey and testing actions. Although a number of studies have shown that both archaeological sites are heavily damaged and lack integrity, there is no clear consensus on National Register of Historic Places eligibility. Further, continued findings of historic burials associated with the post-Mexican War cemetery are also a concern. Therefore, the district proposes to conduct limited Phase II testing to determine archaeological site eligibility and locate any remaining historic period graves. We would like to work directly with your staff in order to design our field investigations or explore other approaches to this issue.

The Corps looks forward to working with you on this project. We request you respond to this letter with your interest in participating in the testing design. Please contact Mr. Joe Giliberti at (251) 694-4114 or via email at joseph.a.giliberti@sam.usace.army.mil.

Sincerely,

Kenneth P. Bradley
Chief, Environmental and Resources
Branch

Enclosure



Enclosure 1. Project location shown on aerial photograph composite.

GULF RESTORATION NETWORK

UNITED FOR A HEALTHY GULF

338 Baronne St., Suite 200, New Orleans, LA 70112
Mailing Address: P.O. Box 2245, New Orleans, LA 70176
Phone: (504) 525-1528 Fax: (504) 525-0833
www.healthygulf.org

April 26, 2011

Mr. Philip A. Hegji
Attn: Coastal Branch
United States Army Engineer District
P.O. Box 2288
Mobile, AL 36628-0001

Mississippi Dept. of Environmental Quality
Office of Pollution Control
Attn: Ms. Florance Watson, P.E.
P.O. Box 2261
Jackson, MS 39225

Mississippi Dept. of Marine Resources
Attn: Mr. Ron Cole
1141 Bayview Ave., Suite 101
Biloxi, MS 39530

RE: Joint Public Notice SAM-2011-00389-PAH; Pascagoula Lower Sound/Bayou Casotte Federal Channel Widening

I am writing on behalf of the Gulf Restoration Network (GRN), a network of local, regional, and national environmental, environmental justice, social justice, and public interest groups dedicated to uniting and empowering people to protect and restore the natural resources of the Gulf Region for future generations. The GRN has serious concerns with the application for a Section 10 Permit submitted to the U.S. Army Corps of Engineers (Corps) by Jackson County Port Authority (herein after "The Port") to expand the Pascagoula Lower Sound/Bayou Casotte Federal Channel (herein after "The Federal Channel") through the Mississippi Sound. While we are providing these general questions and comments, we note that many of the details of this plan are currently unavailable, making it difficult to fully comment on the proposal.

Questions

1. What is the total cost to widen the Federal Channel? Who will pay for such costs and how much will each entity contribute?

2. What are the total costs to maintain the new width of the Federal Channel? Will the depth of a wider channel be more difficult and costly to maintain? How often will dredging have to take place? Will dredging have to be increased? Who will pay for such costs and how much will each entity contribute?

3. What are the total benefits to widen the Federal Channel? Do the benefits outweigh the costs to widen and maintain a larger Federal Channel?

4. Has Congress approved the widening of the Channel? What specific legislation approved the original creation of the navigation channel?

5. Will the Federal Channel also be longer? A statement in the public notice makes it unclear: "The improved channel length would be approximately 38,137 feet (7.22 miles) long."

6. The Port calls for the beneficial use of the dredge material but admits that only about 10% of the material may be appropriate for beneficial use. It seems that beneficial use of dredge materials would be quite appropriate. Why is only 10% "suitable?" How much dredge material will be produced for the widening and annual maintenance of the Federal Channel?

7. The public notice states a claim by the Port that the dredging, "will provide improved habitat conditions." From which basis does the Port reach this conclusion? Dredging of the channel and depositing fill in the Mississippi Sound will likely have a negative impact on habitat. What is the Port's rationale?

8. Has the Port considered the impact to the Mississippi Barrier Islands that would be caused by the expansion of the Federal Channel? Will the Port fund barrier island restoration that may be necessary as a result of increased dredging?

9. The Port states that ships will be traveling faster through the Mississippi Sound. How will faster ships impact marine accidents? Will the wakes created by faster moving ships contribute to erosion of coastal and barrier island shorelines? Will faster moving ships contribute to deaths of marine mammals through increased ship strikes? Do faster moving ships create more marine noise that could impair species that rely on sonar?

10. Will the expansion of the Federal Channel lead to an increase in the number of ships entering the Mississippi Sound?

11. Is the Port planning on expanding the infrastructure on shore, for instance, is the Port planning on building more piers, revetments, concessions, docks, berths, or any other type of construction?

12. How will the dredging of the Mississippi Sound and Bayou Casotte impact the environment and residents in terms of water quality, habitat, noise pollution, air pollution, accidents, Essential Fish Habitat, Submerged Aquatic Vegetation, cultural resources, archeological resources, endangered species, environmental justice communities and other vulnerable populations, commercial and recreational activities, Gulf Island National Seashores (particularly Petit Bois and Horn Island, ship strikes, littoral sediments, erosion, and designated uses.

13. How will this project impact the MSCIP and CIAP plans?

Comments

I. The Corps Must Require Jackson County Port Authority to Prepare an Environmental Impact Statement

The proposed expansion of the Federal Channel through the Mississippi Sound and Bayou Casotte would be happening at the same time as other dredging and expansions in the Mississippi Sound will be occurring. The Port of Gulfport and the CIAP funded Long Beach Harbor expansion will also have impacts on the fragile ecosystem in the Mississippi Sound. Given the multiple assaults to Mississippi's natural resource, the full extent of the cumulative impact should be studied. Further, the law states that plans similar to other Corps' projects that have required an Environmental Impact Statement should also require an EIS. Id. at § 1501.4(e)(2)(i).

II. The Corps should hold a public meeting

The people of Pascagoula and the surrounding area should be given the opportunity to hear about this project and ask questions of the Corps, MDMR, MDEQ, and the Jackson County Port Authority.

I appreciate the opportunity to submit these questions and comments and would appreciate receiving a written notification of any decisions.

Respectfully submitted,

Casey DeMoss Roberts, MSPH
Assistant Director of Science and Water Policy

cc: US EPA Region 4

MISSISSIPPI
DEPARTMENT OF WILDLIFE, FISHERIES, AND PARKS

Sam Polles, Ph.D.
Executive Director

April 27, 2011

Philip Hegji
U.S. Army Engineer District, Mobile
Coastal Branch
P.O. Box 2288
Mobile, AL 36628

Florance Watson
Mississippi Department of Environmental Quality
Office of Pollution Control
P.O. Box 2261
Jackson, MS 39225

Ron Cole
Mississippi Department of Marine Resources
1141 Bayview Avenue
Suite 101
Biloxi, MS 39530

Re: Application by Jackson County Port Authority
SAM-2011-00389-PAH **R# 8285**
Pascagoula, Jackson County, Mississippi

To Whom It May Concern,

In response to your request for information dated February 24, 2011, we have searched our database for occurrences of state or federally listed species and species of special concern that occur within 2 miles of the site of the proposed project. Please find our concerns and recommendations below.

The following species of concern have been documented within 2 miles of the proposed project area:

SCIENTIFIC NAME	COMMON NAME	FED	STATE	STATE RANK
Caretta caretta	Loggerhead Sea Turtle	LT	LE	S1B,SZN
Chelonia mydas	Green Turtle	LE,LT	LE	
Dermochelys coriacea	Leatherback Sea Turtle	LE	LE	
Eretmochelys imbricata	Hawksbill Sea Turtle	LE	LE	
Lepidochelys kempii	Kemp's Ridley Sea Turtle	LE	LE	S1N
Trichechus manatus	Manatee	LE	LE	
Charadrius melodus	Piping Plover	LE,LT	LE	S2N
Paronychia erecta	Beach Sand-Squares			S1S2
Thalasseus maximus	Royal Tern			S1B,S4N
Thalasseus sandvicensis	Sandwich Tern			S1B,S4N
Malaclemys terrapin pileata	Mississippi Diamondback Terrapin			S2
Helianthemum arenicola	Gulf Rock Rose			S1S2

State Rank

S1 — Critically imperiled in Mississippi because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it vulnerable to extirpation.

S2 — Imperiled in Mississippi because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it vulnerable to extirpation.

S3 — Rare or uncommon in Mississippi (on the order of 21 to 100 occurrences).

State and Federal Status

LE Endangered — A species which is in danger of extinction throughout all or a significant portion of its range.

LT Threatened — A species likely to become endangered in foreseeable future throughout all or a significant portion of its range.

Recommendations:

Precautions should be taken to ensure that dredging gear does not entrain/kill any state/federally listed species. We recommend that preemptive trawling around the dredge head be conducted to capture sea turtles, gulf sturgeon, and manatees and relocate them out of harm's way. The U.S. Fish & Wildlife Service and/or National Marine Fisheries Service can provide contact information for professional firms familiar with capture techniques for listed species.

We also recommend that impacts to Sand Island and other barrier islands, as well as Submerged Aquatic Vegetation be avoided.

Please feel free to contact us if we can provide any additional information, resources, or assistance that will help minimize negative impacts to the species and/or ecological communities identified in this review. We are happy to work with you to ensure that our state's precious natural heritage is conserved and preserved for future Mississippians.

Sincerely,

Andy Sanderson

Andy Sanderson, Ecologist
Mississippi Natural Heritage Program
(601) 354-7303

The Mississippi Natural Heritage Program (MNHP) has compiled a database that is the most complete source of information about Mississippi's rare, threatened, and endangered plants, animals, and ecological communities. The quantity and quality of data collected by MNHP are dependent on the research and observations of many individuals and organizations. In many cases, this information is not the result of comprehensive or site-specific field surveys; most natural areas in Mississippi have not been thoroughly surveyed and new occurrences of plant and animal species are often discovered. Heritage reports summarize the existing information known to the MNHP at the time of the request and cannot always be considered a definitive statement on the presence, absence or condition of biological elements on a particular site.

MISSISSIPPI DE[PA]RTMENT *of* ARCHIV[E]S AND HISTORY

MDAH

PO Box 571, Jackson, MS 39205-0571
601-576-6850 • Fax 601-576-6975
mdah.state.ms.us
H.T. Holmes, Director

Philip

May 2, 2011

Mr. Philip A. Hegji
U.S. Army Engineer District, Mobile District
Post Office Box 2288
Mobile, Alabama 36628-0001

RE: SAM-2011-00389-PAH; Proposed widening of the Pascagoula Lower Sound/Bayou Casotte Federal Channel by the Jackson County Port Authority, MDAH Project Log #04-100-11, Jackson County

Dear Mr. Hegji:

We have reviewed your request for a cultural resources assessment, received on April 15, for the above referenced project in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information provided, it is our determination that no cultural resources are likely to be affected. Therefore, we have no objection with the proposed undertaking.

Should there be additional work in connection with the project, or any changes in the scope of work, please let us know in order that we may provide you with appropriate comments in compliance with the above referenced regulations.

If you have any questions, please do not hesitate to contact us at (601) 576-6940.

Sincerely,

Hal Bell

Hal Bell
Review and Compliance Assistant

FOR: Greg Williamson
Review and Compliance Officer

RECEIVED
MAY 06 2011

U.S. Department of Homeland Security
United States Coast Guard

Commander
Eighth Coast Guard District

Hale Boggs Federal Building
500 Poydras Street, Room 1230
New Orleans, LA 70130-3396
Staff Symbol: (dpw)
Phone: (504) 671-2103
Fax: (504) 671-2137

16630
May 6, 2010

District Engineer
U. S. Army Engineer District Mobile
Attention: Coastal Branch, Mr Philip A. Hegji
P.O. Box 2288
Mobile, AL 36628-0001

Dear Mr. Hegji:

This letter is in response to Public Notice Number SAM-2011-00389-PAH, Proposed impacts to open water associated with the expansion of the Bayou Casotte Channel and Lower Mississippi Sound Channel by the Jackson County Port Authority, Pascagoula, Jackson County, Mississippi.

The Coast Guard currently has 15 fixed structures and 11 floating navigational aids in the proposed 7.22 mile stretch of channel that would potentially need to be relocated.

Dredging the channel solely on one side, 100 feet on the west side parallel to the existing channel centerline, would have a profound effect on the accuracy of five sets of navigational ranges (10 fixed structures) that are critical to the safe pilotage of the channel. The Coast Guard is not in a position to relocate these ranges in a timely manner and does not have proper funding identified for relocation projects. We ask that the dredging project, if completed, be done in a manner that does not require the relocation of the 10 range structures. A possible alternative, allowing the ranges to remain in the same place, would be to dredge 50 feet on either side of the channel to ensure that the actual centerline of the channel would not be affected. Relocating the fixed and floating aids to navigation along the channel edge can be done with Coast Guard resources at a much smaller cost.

I am unable to favorably endorse this project as it is proposed. If you or the applicants have any further questions concerning this matter, please contact Lieutenant Commander Heather Stratton at (504) 671-2112.

Sincerely,

TIMOTHY J. WENDT
Commander, U.S. Coast Guard
Waterways Management Branch Chief
Eighth Coast Guard District

Copy:
Coast Guard Sector Mobile (spw)
Mississippi Department of Environmental Quality, Office of Pollution Control
Mississippi Department of Marine Resources

ALABAMA-COUSHATTA TRIBE OF TEXAS
571 State Park Road 56 • Livingston, Texas 77351 • (936) 563-1100

May 9, 2011

Philip

U.S. Army Engineer District, Mobile
Attn: Coastal Branch (Hegji)
P.O. Box 2288
Mobile, AL 36628-0001

Re: SAM-2011-0389-PAH

Dear District Engineer:

On behalf of Mikko Oscola Clayton Sylestine and the Alabama-Coushatta Tribe, our appreciation is expressed on your efforts to consult us regarding the Jackson County Port Authority proposal in Jackson County.

Our Tribe maintains ancestral associations within the state of Mississippi despite the absence of written records to completely identify Tribal activities, villages, trails, or grave sites. However, it is our objective to ensure significances of Native American ancestry including the Alabama-Coushatta Tribe are administered with the utmost regard.

Upon review of your April 15, 2011 submission, no immediately known impacts to religious, cultural, or historical assets of the Alabama-Coushatta Tribe are anticipated in conjunction with this proposal. In the event of inadvertent discovery of human remains and/or archaeological artifacts, activity in proximity to the location must cease and appropriate authorities, including our office, notified without delay for further consultation.

Copies of this response may be forwarded to agencies involved with this review by your office. Should you require additional assistance, please do not hesitate to contact us.

Respectfully submitted,

Bryant J. Celestine
Historic Preservation Officer

RECEIVED
MAY 13 2011
By

Telephone: 936 – 563 – 1181 celestine.bryant@actribe.org Fax: 936 – 563 – 1183

MISSISSIPPI DEPARTMENT *of* ARCHIVES AND HISTORY

MDAH

PO Box 571, Jackson, MS 39205-0571
601-576-6850 • Fax 601-576-6975
mdah.state.ms.us
H.T. Holmes, Director

May 10, 2011

Mr. Kenneth P. Bradley
Mr. Joseph A. Giliberti
Mobile District, USACOE
P.O. Box 2288
Mobile, Alabama 36628-0001

RE: Request for Consultation and Coordination for Proposed Pascagoula Harbor Navigation Channel project, Permit # (SAM-2011-00389-PAH)
MDAH Project Log #04-144-11, Jackson County

Dear Mr. Bradley:

We have reviewed your letter dated April 18, 2011, and received April 22, 2011, regarding the above referenced project. We would like to consult with you regarding the survey plan and work plans for the project. The University of Southern Mississippi has recently done work on Greenwood Island. In addition, we have received a significant collection form Greenwood Island in the last 2 years. Please call Pam Lieb, MDAH Chief Archaeologist, at (601) 576-6940, to discuss this project in greater detail.

If I can be of further assistance, please contact me at (601) 576-6940.

Sincerely,

Greg Williamson
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Officer

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, AL 36628-0001

REPLY TO
ATTENTION OF:

June 6, 2011

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Jackson County Port Authority
Attention: Mr. Allen Moeller
Post Office Box 70
Pascagoula, Mississippi 39568

Dear Mr. Moeller:

This letter is in response to your April 6, 2011 request, for a Department of the Army (DA) permit. Your project has been assigned file number SAM-2011-00389-PAH; please refer to it in all future correspondence. The project is to widen the Bayou Casotte and Lower Pascagoula Sound Federal Channel. The project is located in Mississippi Sound, Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365° North, Longitude 88.556° West). Your project was advertised by a 30-day public notice April 15, 2011; the comment period was extended an additional 15 days to allow additional comments.

It is the policy of the DA to provide an applicant the comments received during the public comment period. In the case of your project, as proposed, several comments were received. Additionally, we are in the process of evaluating the comments received in addition to your request to conduct an Environmental Impact Statement. We will notify you when the evaluation is completed in accordance with our regulations outlined in 33 CFR 325.

If you have any questions or need additional assistance, please do not hesitate to call me at (251) 690-3222 or via e-mail at philip.a.hegji@usace.army.mil. For additional information about our Regulatory Program, visit our web site at: www.sam.usace.army.mil/rd/reg and please take a moment to complete our customer satisfaction survey while you're there. Your responses are appreciated and will allow us to improve our services.

Sincerely,

Philip A. Hegji

Philip A. Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Enclosures

Copy Furnished:

Mississippi Department
of Marine Resources
Attention: Mr. Ron Cole
1141 Bayview Avenue, Suite 101
Biloxi, Mississippi 39530

Mississippi Department of
Environmental Quality
Office of Pollution Control
Attention: Ms. Florance Watson, P.E.
Post Office Box 2261
Jackson, Mississippi 39225-2261

STATE OF MISSISSIPPI
HALEY BARBOUR
GOVERNOR
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
TRUDY D. FISHER, EXECUTIVE DIRECTOR
July 25, 2011

Mr. Philip Hegji
U.S. Army Corps of Engineers, Mobile District
Post Office Box 2288
Mobile, Alabama 36628-0001

Mr. Allen Moeller
Jackson County Port Authority
Post Office Box 70
Pascagoula, Mississippi 39568

Dear Sirs:

Re: Jackson County Port Authority
Jackson County
COE No. SAM201100389PAH
WQC No. WQC2011010

The Mississippi Department of Environmental Quality is presently reviewing the above referenced project in which the applicant, Jackson County Port Authority, is applying for a Department of the Army permit to widen the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment 100 feet on the west side parallel to the existing channel centerline to the existing depth of -42 feet mean high tide. The improved channel length would be approximately 38,137 feet (7.22 miles) long. New work dredging quantity estimates are approximately 3.35 million cubic yards. The new work material would be dredged with combinations of hopper, hydraulic pipeline and/or mechanical type dredges. It is anticipated that most of the material associated with the channel improvement measures would be hydraulically excavated. Preliminary results indicate that a small portion of the material is sand and could be suitable for beneficial use. The suitable material could be placed in the littoral zone disposal area, located southeast of the east end of Horn Island. The remaining material would be placed in the U.S. EPA's designated Pascagoula Ocean Dredged Material Disposal Area.

The Department understands the applicant has requested that an Environmental Impact Statement (EIS) process begin as outlined in the National Environmental Policy Act. Given the scope of work and the amount of construction activities proposed, the Department will reserve comments related to these considerations until such time as more complete information is available. The applicant is encouraged to reference the enclosed scope of review for application decisions for a Water Quality Certification for the described activities when providing information to the Department on this subject application. This information may also be found in Chapter 3 of the Mississippi Wastewater Regulations.

OFFICE OF POLLUTION CONTROL
POST OFFICE BOX 2261 • JACKSON, MISSISSIPPI 39225-2261 • TEL: (601) 961-5171 • FAX: (601) 354-6612 • www.deq.state.ms.us
AN EQUAL OPPORTUNITY EMPLOYER

The Department looks forward to continued cooperation in the review process for this project. Should you have any questions or need any additional information, please contact me at (601) 961-5322.

Sincerely,

Carrie Barefoot

Carrie Barefoot, P.E.
Water Quality Certification Branch

Enclosure

cc: Mr. Ron Cole, Department of Marine Resources

MISSISSIPPI DEPARTMENT of ARCHIVES AND HISTORY

MDAH

PO Box 571, Jackson, MS 39205-0571
601-576-6850 • Fax 601-576-6975
mdah.state.ms.us
H.T. Holmes, Director

July 29, 2011

Mr. Kenneth P. Bradley
Mr. Joseph A. Giliberti
Mobile District, USACOE
P.O. Box 2288
Mobile, Alabama 36628-0001

RE: Proposed Site Plan for the Treatment of Human Remains for Greenwood Island Site: Proposed Pascagoula Harbor Navigation Channel widening project on Bayou Casotte, Permit # (SAM-2011-00389-PAH)
MDAH Project Log # 07-048-11, (#04-144-11), Jackson County

Dear Mr. Bradley:

We have reviewed the scope of work and proposed treatment plan for archaeological site # 22Ja516, received July 12, 2011, for the above referenced project in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information received, we approve of the scope of work and treatment plan. As such, we have no reservations with the project.

As the excavation of historic human remains requires a permit from the Mississippi Department of Archives and History, please sign both copies of the enclosed permit and return one copy to us.

If we can be of further assistance, please contact me at (601) 576-6940.

Greg

Greg Williamson
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Officer

MISSISSIPPI DEPARTMENT *of* ARCHIVES AND HISTORY

MDAH

PO Box 571, Jackson, MS 39205-0571
601-576-6850 • Fax 601-576-6975
mdah.state.ms.us
H.T. Holmes, Director

BURIAL EXCAVATION PERMIT

In compliance with the provisions of the Antiquities Law of Mississippi, Section 39-7-3, et seq., of the Mississippi Code of 1972, the Permit Committee of the Board of Trustees of the Mississippi Department of Archives and History, permittor, in its meeting on July 26, 2011, authorized the issuance of a Burial Excavation Permit to the Mobile District of the United State Army Corps of Engineers, permittee, for the examination, excavation, and treatment of human remains at archaeological site 22Ja516 on Greenwood Island in Bayou Casotte, Jackson County.

Permittee hereby agrees that said excavation and treatment of the aboriginal burials shall be in accordance with the Scope of Work in the July 11, 2011, email of Joseph A. Giliberti; the recommendations of Ken Carleton, Tribal Historic Preservation Officer of the Mississippi Band of Choctaw Indians; and the Mississippi Department of Archives and History's "Policy on Granting Burial Excavation Permits" and *Guidelines for Archaeological Investigations and Reports in Mississippi.*

In the event of changes in or additions to the above project, permittee agrees to submit supplementary plans to the permittor for review and approval.

AUTHORIZED this the 29 day of July, 2011.

H. T. Holmes, Secretary	Mr. Joseph Giliberti
Board of Trustees	Archaeologist
Department of Archives and History	Mobile District, USACOE

MISSISSIPPI DEPARTMENT *of* ARCHIVES AND HISTORY

MDAH

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Permittee hereby agrees that said excavation and treatment of the aboriginal burials shall be in accordance with the Scope of Work in the July 11, 2011, email of Joseph A. Giliberti; the recommendations of Ken Carleton, Tribal Historic Preservation Officer of the Mississippi Band of Choctaw Indians; and the Mississippi Department of Archives and History's "Policy on Granting Burial Excavation Permits" and *Guidelines for Archaeological Investigations and Reports in Mississippi.*

In the event of changes in or additions to the above project, permittee agrees to submit supplementary plans to the permittor for review and approval.

AUTHORIZED this the 29 day of July, 2011.

H. T. Holmes, Secretary	Mr. Joseph Giliberti
Board of Trustees	Archaeologist
Department of Archives and History	Mobile District, USACOE

SUMMARY: Pursuant to the provisions of section 10 of Public Law 92–463, the Federal Advisory Committee Act, notice is hereby given that a closed meeting of the Department of Defense Wage Committee will be held on Tuesday, October 18, 2011, at 10 a.m. at 1400 Key Boulevard, Level A, Room A101, Rosslyn, Virginia 22209.

Under the provisions of section 10(d) of Public Law 92–463, the Department of Defense has determined that the meetings meet the criteria to close meetings to the public because the matters to be considered are related to internal rules and practices of the Department of Defense and the detailed wage data to be considered were obtained from officials of private establishments with a guarantee that the data will be held in confidence.

However, members of the public who may wish to do so are invited to submit material in writing to the chairman concerning matters believed to be deserving of the Committee's attention.

Additional information concerning the meetings may be obtained by writing to the Chairman, Department of Defense Wage Committee, 4000 Defense Pentagon, Washington, DC 20301–4000.

Dated: September 13, 2011.

Patricia L. Toppings,

OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 2011–23920 Filed 9–16–11; 8:45 am]

BILLING CODE 5001–06–P

DEPARTMENT OF DEFENSE

Department of the Air Force

Air University Board of Visitors Meeting

ACTION: Notice of Meeting of the Air University Board of Visitors.

SUMMARY: Under the provisions of the Federal Advisory Committee Act of 1972 (5 U.S.C., Appendix, as amended), the Government in the Sunshine Act of 1976 (5 U.S.C. 552b, as amended), and 41 CFR 102–3.150, the Department of Defense announces that the Air University Board of Visitors' meeting will take place on Tuesday, 4 October 2011, from 1:30 p.m. to approximately 2:30 p.m. The meeting will be a conference call meeting. Please contact Mrs. Diana Bunch, Designated Federal Officer, at (334) 953–4547, for further information to access the conference call. The purpose and agenda of this meeting is to provide independent advice and recommendations on matters pertaining to the strategic positioning of Air University's educational mission. Pursuant to 5 U.S.C. § 552b, as amended, and 41 CFR 102–3.155 all sessions of the Air University Board of Visitors' meeting will be open to the public. Any member of the public wishing to provide input to the Air University Board of Visitors should submit a written statement in accordance with 41 CFR 102–3.140(c) and section 10(a)(3) of the Federal Advisory Committee Act and the procedures described in this paragraph. Written statements can be submitted to the Designated Federal Officer at the address detailed below at any time. Statements being submitted in response to the agenda mentioned in this notice must be received by the Designated Federal Officer at the address listed below at least five calendar days prior to the meeting which is the subject of this notice. Written statements received after this date may not be provided to or considered by the Air University Board of Visitors until its next meeting. The Designated Federal Officer will review all timely submissions with the Air University Board of Visitors' Board Chairperson and ensure they are provided to members of the Board before the meeting that is the subject of this notice. Additionally, any member of the public wishing to attend this meeting should contact either person listed below at least five calendar days prior to the meeting for information on base entry passes.

FOR FURTHER INFORMATION CONTACT: Mrs. Diana Bunch, Designated Federal Officer, Air University Headquarters, 55 LeMay Plaza South, Maxwell Air Force Base, Alabama 36112–6335, telephone (334) 953–4547.

Bao-Anh Trinh,

DAF, Air Force Federal Register Liaison Officer.

[FR Doc. 2011–23925 Filed 9–16–11; 8:45 am]

BILLING CODE 5001–10–P

DEPARTMENT OF DEFENSE

Department of the Army, Corps of Engineers

Intent to Prepare an Environmental Impact Statement (EIS) for a Permit Application for Widening of Bayou Casotte and Lower Sound Channels of the Pascagoula Harbor Channel, in the Port of Pascagoula, Jackson County, Mississippi

AGENCY: U.S. Army Corps of Engineers, DOD.

ACTION: Notice of Intent.

SUMMARY: The U.S. Army Corps of Engineers (Corps) Mobile District Regulatory Division announces its intent to prepare an EIS to assess the potential environmental impacts associated with widening the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment of Pascagoula Harbor (the Project). The proposed Project is a 100-foot-widening of the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor Channel, as well as limited widening of the northern portion of the Horn Island Pass Channel to facilitate the transition between the two channel segments. The Corps is considering the Jackson County Port Authority/Port of Pascagoula (Port) application for a Department of the Army permit under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. A joint public notice for the Section 10 permit (SAM–2011–00389–PAH) was issued by the Corps on April 15, 2011.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and Draft EIS can be answered by Mr. Philip A. Hegji, Corps Project Manager, at (251) 690–3222. Comments shall be addressed to: U.S. Army Corps of Engineers, Mobile District, Regulatory Division, ATTN: File Number SAM–2011–00389–PAH, at P.O. Box 2288, Mobile, Alabama 36628–0001, or street address, 109 St. Joseph Street, Mobile, Alabama 36602.

SUPPLEMENTARY INFORMATION:

1. Background. The EIS will assess the impacts associated with dredging approximately 38,137 feet (7.22 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment to widen the channel 100 feet parallel to the existing channel centerline, to the existing depth of −42 feet mean lower low water, as well as the beneficial use and placement of the dredged material. The proposed project would be developed over approximately the next 2 to 3 years.

The EIS discussed in this notice would support the regulatory process for this specific permit application and Project. The Corps Planning Division is also preparing a separate EIS and Feasibility Study under the Corps Planning Process to evaluate whether there is a Federal interest in modifying the existing federally authorized navigation channel (Federal Navigation Channel) leading to Bayou Casotte (*i.e.,* Pascagoula channel widening from the Horn Island Pass to the entrance of the Bayou Casotte Harbor) and maintenance of the channel.

The primary Federal involvement in this EIS for the Regulatory Division is an application for a permit to dredge or excavate adjacent to a Federal Navigation Channel in or affecting navigable waters of the United States, and potential impacts on the human environment from such activities, as well as the disposal of material in the littoral disposal area, which could be suitable for beneficial use. Also included in the evaluation is the placement of dredged material within the U.S. Environmental Protection Agency (EPA) designated Pascagoula Ocean Dredged Material Disposal Site (ODMDS) and the designated Littoral Zone Placement Area located east and south of the barrier island. It is anticipated that the excavated area would become part of the Federal Navigation Channel in the future, if the Corps adopts maintenance of the widened area, pending approval of the Corps Planning documents described above. No wetland impacts are known to exist at the proposed dredge disposal site. In accordance with the National Environmental Policy Act (NEPA), the Corps is requiring the preparation of an Environmental Impact Statement (EIS) prior to rendering a final decision on the Port's permit application, based on potentially significant impacts to water quality, cultural resources, endangered or threatened species, or sediment transport. The Corps may ultimately make a determination to approve the permit, approve the permit with conditions, or deny the permit for the above project.

This effort will also support non-federal construction of the project and, in concert with the parallel Planning Division EIS, the potential federal maintenance under the authority of Section 204(b) of the Water Resources Development Act of 1986.

Pursuant to the National Environmental Policy Act of 1969 (as amended), the Corps will serve as Lead Agency for the Preparation of an EIS. The Draft EIS is intended to be sufficient in scope to address both the Federal and the state and local requirements and environmental issues concerning the proposed activities and permit approvals. The National Marine Fisheries Service (NMFS) has expressed interest in acting as a cooperating agency in the preparation of the EIS.

2. Project Purpose and Need. The overall project purpose is to widen the existing Federal Navigation Channel, including excavation, as needed, to reconfigure the site to alleviate the current transit restrictions and increase travel efficiencies for vessel transit, improve safety conditions for vessel operations, improve conditions for port operations, and improve habitat conditions through the beneficial use of dredged material.

3. Issues. There are several potential environmental issues that will be addressed in the EIS. Additional issues may be identified during the scoping process. Issues initially identified as potentially significant include:

a. Impacts to traffic, including marine navigation and ground transportation;

b. Potential impacts to endangered and threatened species;

c. Air quality;

d. Water quality;

e. Socioeconomic effects;

f. Cumulative impacts; and

g. Placement of dredged materials.

4. Alternatives. Alternatives initially being considered for the proposed improvement project include the following:

a. No Project/No Action. .This alternative would not implement any of the elements presented in the project description.

b. Widening 100 feet on the West Side. This alternative is the proposed Project to widen the Federal Channel segment approximately 100 feet parallel to the existing channel centerline, to the existing depth of −42 feet mean lower low water. The width may be increased as necessary to allow adequate transit for navigation in transition zones. The improved channel would be 7.22 miles long and result in excavation of approximately 3.4 to 3.8 million cubic yards of dredged material.

c. Widening of 50 feet on Either Side of the Channel Centerline. This alternative includes a proposal to widen the Federal Channel segment, approximately 50 feet on either side of the existing channel centerline, to the existing depth of −42 feet mean lower low water. The width may be increased as necessary to allow adequate transition for navigation. The improved channel would be similar in length and dredged material quantities to the proposed Project (widening 100 feet on the West Side).

5. Scoping Process. As part of the Corps Planning Division EIS, a public scoping meeting was conducted for the proposed Bayou Casotte and Lower Sound Channels Widening of the Pascagoula Harbor Channel. The meeting was held to receive public comments and assess public concerns regarding the appropriate scope and preparation of the Draft EIS. Participation in the public meeting by Federal, State, and local agencies and other interested organizations and persons was encouraged. This meeting was conducted in English, and was held on Thursday, February 25, 2010 from 5:30 p.m. to 7:30 p.m., located at the Pascagoula Public Library, 3214 Pascagoula Street, Pascagoula, MS 39567.

A comment period was held for the Regulatory Division on the permit application, which was noticed April 15, 2011. The comment period was held from April 15, 2011 to May 16, 2011.

The Corps will be accepting written comments on this Notice of Intent to prepare an EIS, and they will be taken into consideration during development of the document. We encourage any additional comments from interested public, agencies, and local officials. Written and e-mailed comments to the Corps will be received until October 20, 2011. Written comments should be sent to the address below:

U.S. Army Corps of Engineers, Mobile District, Regulatory Division, c/o Philip A. Hegji, 109 St. Joseph Street, Mobile, Alabama 36628–0001, e-mail: *Philip.A.Hegji@usace.army.mil.*

6. Availability of the Draft EIS. The Corps expects the Draft EIS to be made available to the public in late spring 2012. A public hearing will be held during the public comment period for the Draft EIS.

Dated: September 9, 2011.

Craig J. Litteken,

Chief, Regulatory Division.

[FR Doc. 2011–23994 Filed 9–16–11; 8:45 am]

BILLING CODE P

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Senior Executive Service Performance Review Board

AGENCY: Defense Nuclear Facilities Safety Board.

ACTION: Notice.

SUMMARY: This notice announces the membership of the Defense Nuclear Facilities Safety Board (DNFSB) Senior Executive Service (SES) Performance Review Board (PRB).

DATES: *Effective Date:* September 19, 2011.

ADDRESSES: Send comments concerning this notice to: Defense Nuclear Facilities Safety Board, 625 Indiana Avenue, NW., Suite 700, Washington, DC 20004–2001.

FOR FURTHER INFORMATION CONTACT: Deborah Biscieglia by telephone at (202) 694–7041 or by e-mail at *debbieb@dnfsb.gov.*

SUPPLEMENTARY INFORMATION: 5 U.S.C. 4314(c)(1) through (5) requires each agency to establish, in accordance with regulations prescribed by the Office of Personnel Management, one or more

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, AL 36628-0001

September 29, 2011

REPLY TO
ATTENTION OF

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority/Port of Pascagoula

U.S. Fish and Wildlife Service
Attention: Mr. Paul Necaise
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

Dear Mr. Necaise:

The U.S. Army Corps of Engineers, Mobile District (USACE) intends to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.), and the Council on Environmental Quality NEPA regulations (40 CFR Parts 1500-1 508) to assess the potential environmental impacts associated with the construction and operation of a project proposed by the Jackson County Port Authority/Port of Pascagoula (Port). The Port has filed a permit application with USACE for impacts to the existing Federal Channel and jurisdictional waters of the United States, under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. The project proposed by the Port is a 100-foot widening of the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor Channel, as well as limited widening of the northern portion of the Horn Island Pass Channel to facilitate the transition between the two channel segments. The overall project purpose is to widen the existing Federal Navigation Channel to reconfigure the site to alleviate the current transit restrictions and increase travel efficiencies for vessel transit, improve safety conditions for vessel operations, improve conditions for port operations, and improve habitat conditions through the beneficial use of dredged material.

Potential impacts associated with the proposed project include dredging approximately 38,137 feet (7.22 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment to widen the channel 100 feet parallel to the existing channel centerline, to the existing depth of -42 feet mean lower low water, as well as the beneficial use and placement of the dredged material. Disposal alternatives being considered include placement of a portion of the dredged material within the U.S. Environmental Protection Agency's designated Pascagoula Ocean Dredged Material Disposal Site, and placement of a portion of the dredged material in the designated Littoral Zone Placement Area located east and south of the barrier island.

The USACE is collecting data for the preparation of an EIS. The level of detail for our assessment will be as necessary to describe existing conditions, as well as provide analysis of future conditions due to project impacts. The intent of this letter is to request specific information on threatened and endangered species under your purview occurring in the study area that should be addressed for the project and any conservation recommendations that you may suggest.

Please reply at your earliest convenience to indicate whether your agency or any of its services, bureaus or offices has any information to provide relevant to the proposed project. Should you wish to discuss the EIS or have any questions, please call Mr. Philip Hegji at (251) 690-3222 or email at philip.a.hegji@usace.army.mil.

Sincerely,

Munther Sahawneh

Munther N. Sahawneh
Chief, Coastal Branch
Regulatory Division

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, AL 36628-0001

September 29, 2011

REPLY TO
ATTENTION OF

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority/Port of Pascagoula

National Marine Fisheries Service
Attention: Dr. Roy E. Crabtree
Regional Administrator
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701

National Marine Fisheries Service
Attention: Mr. David L. Keys, CEP
NEPA Coordinator
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701

Gentlemen:

The U.S. Army Corps of Engineers, Mobile District (USACE) intends to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.), and the Council on Environmental Quality NEPA regulations (40 CFR Parts 1500-1 508) to assess the potential environmental impacts associated with the construction and operation of a project proposed by the Jackson County Port Authority/Port of Pascagoula (Port). The Port has filed a permit application with USACE for impacts to the existing federal channel and jurisdictional waters of the United States under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. The project proposed by the Port is a 100-foot widening of the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor Channel, as well as limited widening of the northern portion of the Horn Island Pass Channel to facilitate the transition between the two channel segments. The overall project purpose is to widen the existing Federal Navigation Channel to reconfigure the site to alleviate the current transit restrictions and increase travel efficiencies for vessel transit, improve safety conditions for vessel operations, improve conditions for port operations, and improve habitat conditions through the beneficial use of dredged material.

Potential impacts associated with the proposed project include dredging approximately 38,137 feet (7.22 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment to widen the channel 100 feet parallel to the existing channel centerline, to the existing depth of -42 feet mean lower low water, as well as the beneficial use and placement of the dredged material. Disposal alternatives being considered include placement of a portion of the dredged material within the U.S. Environmental Protection Agency (EPA) designated Pascagoula Ocean Dredged Material Disposal Site (ODMDS), and placement of a portion of the dredged material in the designated Littoral Zone Placement Area located east and south of the barrier island.

The USACE is collecting data for the preparation of an EIS. The level of detail for our assessment will be as necessary to describe existing conditions, as well as provide analysis of future conditions due to project impacts. The intent of this letter is to request specific information on resources under your purview that should be addressed for the project, and any conservation recommendations that you may suggest.

As discussed in 40 CFR 1501.6, agencies with jurisdiction by law or with special expertise with respect to environmental issues to be addressed in the EIS may be cooperating agencies for the EIS. Please reply at your earliest convenience to indicate whether your agency, or any of its services, bureaus or offices, has interest in participating as a cooperating agency on this EIS. Should you wish to discuss the EIS or have any questions, please call Mr. Philip Hegji at (251) 690-3222 or email at philip.a.hegji@usace.army.mil.

Sincerely,

Munther Sahawneh

Munther N. Sahawneh
Chief, Coastal Branch
Regulatory Division

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, AL 36628-0001

September 29, 2011

REPLY TO
ATTENTION OF

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority/Port of Pascagoula

U.S. Coast Guard
Commander Timothy J. Wendt
Eighth Coast Guard District
Hale Boggs Federal Building
500 Poydras Street
New Orleans, Louisiana 70130

Dear Commander Wendt:

The U.S. Army Corps of Engineers, Mobile District (USACE) intends to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.), and the Council on Environmental Quality NEPA regulations (40 CFR Parts 1500-1 508) to assess the potential environmental impacts associated with the construction and operation of a project proposed by the Jackson County Port Authority/Port of Pascagoula (Port). The Port has filed a permit application with USACE for impacts to the existing Federal Channel and jurisdictional waters of the United States under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. The project proposed by the Port is a 100-foot widening of the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor Channel, as well as limited widening of the northern portion of the Horn Island Pass Channel to facilitate the transition between the two channel segments. The overall project purpose is to widen the existing Federal Navigation Channel to reconfigure the site to alleviate the current transit restrictions and increase travel efficiencies for vessel transit, improve safety conditions for vessel operations, improve conditions for port operations, and improve habitat conditions through the beneficial use of dredged material.

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Sincerely,

Munther Sahawneh

Munther N. Sahawneh
Chief, Coastal Branch
Regulatory Division

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, AL 36628-0001

REPLY TO
ATTENTION OF

September 29, 2011

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority/Port of Pascagoula

U.S. Environmental Protection
Agency, Region 4
Attention: Mr. Heinz Mueller
Sam Nunn Atlanta Federal Center
61 Forsyth Street Southwest
Atlanta, Georgia 30303-8960

Dear Mr. Mueller:

The U.S. Army Corps of Engineers, Mobile District (USACE) intends to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.), and the Council on Environmental Quality NEPA regulations (40 CFR Parts 1500-1 508) to assess the potential environmental impacts associated with the construction and operation of a project proposed by the Jackson County Port Authority/Port of Pascagoula (Port). The Port has filed a permit application with USACE for impacts to the existing Federal Channel and jurisdictional waters of the United States under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act.

The project proposed by the Port is a 100- foot widening of the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor Channel, as well as limited widening of the northern portion of the Horn Island Pass Channel to facilitate the transition between the two channel segments. The overall project purpose is to widen the existing Federal Navigation Channel to reconfigure the site to alleviate the current transit restrictions and increase travel efficiencies for vessel transit, improve safety conditions for vessel operations, improve conditions for port operations, and improve habitat conditions through the beneficial use of dredged material.

Potential impacts associated with the proposed project include dredging approximately 38,137 feet (7.22 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment to widen the channel 100 feet parallel to the existing channel centerline, to the existing depth of -42 feet mean lower low water, as well as the beneficial use and placement of the dredged material. Disposal alternatives being considered include placement of a portion of the dredged material within the U.S. Environmental Protection Agency (EPA) designated Pascagoula Ocean Dredged Material Disposal Site (ODMDS), and placement of a portion of the dredged material in the designated Littoral Zone Placement Area located east and south of the barrier island.

The USACE is collecting data for the preparation of an EIS. The level of detail for our assessment will be as necessary to describe existing conditions, as well as provide analysis of future conditions due to project impacts. The intent of this letter is to request specific information on resources under your purview that should be addressed for the project, and any conservation recommendations that you may suggest.

As discussed in 40 CFR 1501.6, agencies with jurisdiction by law or with special expertise with respect to environmental issues to be addressed in the EIS may be cooperating agencies for the EIS. Please reply at your earliest convenience to indicate whether your agency or any of its services, bureaus, or offices has interest in participating as a cooperating agency on this EIS. Should you wish to discuss the EIS or have any questions, please call Mr. Philip Hegji at (251) 690-3222 or email at philip.a.hegji@usace.army.mil.

Sincerely,

Munther Sahawneh

Munther N. Sahawneh
Chief, Coastal Branch
Regulatory Division

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, AL 36628-0001

September 29, 2011

REPLY TO
ATTENTION OF

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority/Port of Pascagoula

Mississippi Department
of Archives and History
Attention: Mr. Greg Williamson
Post Office Box 571
Jackson, Mississippi 39205

Dear Mr. Williamson:

The U.S. Army Corps of Engineers, Mobile District (USACE) intends to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.), and the Council on Environmental Quality NEPA regulations (40 CFR Parts 1500-1 508) to assess the potential environmental impacts associated with the construction and operation of a project proposed by the Jackson County Port Authority/Port of Pascagoula (Port). The Port has filed a permit application with USACE for impacts to the existing Federal Channel and jurisdictional waters of the United States, under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. The project proposed by the Port is a 100-foot widening of the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor Channel, as well as limited widening of the northern portion of the Horn Island Pass Channel to facilitate the transition between the two channel segments. The overall project purpose is to widen the existing Federal Navigation Channel to reconfigure the site to alleviate the current transit restrictions and increase travel efficiencies for vessel transit, improve safety conditions for vessel operations, improve conditions for port operations, and improve habitat conditions through the beneficial use of dredged material.

Potential impacts associated with the proposed project include dredging approximately 38,137 feet (7.22 miles) of the existing Pascagoula Lower Sound / Bayou Casotte Federal Channel segment to widen the channel 100 feet parallel to the existing channel centerline, to the existing depth of -42 feet mean lower low water, as well as the beneficial use and placement of the dredged material. Disposal alternatives being considered include placement of a portion of the dredged material within the U.S. Environmental Protection Agency's designated Pascagoula Ocean Dredged Material Disposal Site, and placement of a portion of the dredged material in the designated Littoral Zone Placement Area located east and south of the barrier island.

The USACE is collecting data for the preparation of an EIS. The level of detail for our assessment will be as necessary to describe existing conditions, as well as provide analysis of future conditions due to project impacts. The intent of this letter is to request specific information on cultural resources occurring in the study area that should be addressed for the project and any conservation recommendations that you may suggest.

Please reply at your earliest convenience to indicate whether your agency or any of its services, bureaus, or offices has any information to provide relevant to the proposed project. Should you wish to discuss the EIS or have any questions, please call Mr. Philip Hegji at (251) 690-3222 or email at philip.a.hegji@usace.army.mil.

Sincerely,

Munther Sahawneh

Munther N. Sahawneh
Chief, Coastal Branch
Regulatory Division

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
(727) 824-5317; FAX 824-5300
http://sero.nmfs.noaa.gov

F/SER4: RS

OCT 17 2011

OCT 21 2011

Colonel Steven J. Roemhildt, District Engineer
Department of the Army
Coastal Branch, Regulatory Division
Mobile District, Corps of Engineers
P. O. Box 2288
Mobile, Alabama 36628-0001

Subject: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority/Port of Pascagoula.

Dear Colonel Roemhildt:

NOAA's National Marine Fisheries Service (NMFS), Southeast Region, has received Mr. Munther N. Sahawneh's letter, dated September 29, 2011, inviting NMFS to participate as a cooperating agency in the development of an environmental impact statement (EIS) for the channel widening project proposed in Mississippi Sound within Jackson County, Mississippi. The overall project purpose is to widen the existing Federal Navigation Channel within the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor and the northern portion of Horn Island Pass channels to alleviate current vessel traffic restrictions to the port.

The letter also requests NMFS provide specific information on resources under our purview that should be addressed in the EIS where our agency has regulatory authority or specialized expertise. As the project alternatives become more fully defined during the EIS process, we expect to develop conservation recommendations for activities potentially affecting those portions of the project area designated as essential fish habitat in the 2006 generic amendment to the Fishery Management Plans for the Gulf of Mexico and for federally listed threatened and endangered species under purview of NMFS. In accordance with the Endangered Species Act of 1973, as amended, it is the U.S. Army Corps of Engineers' responsibility to review this proposal and identify actions that may affect endangered or threatened species.

We request you include Mr. Mark Thompson with NMFS Southeast Region, Habitat Conservation Division in Panama City, Florida, and Mr. Ryan Hendren with NMFS Southeast Region, Protected Resources Division in St. Petersburg, Florida, as the NMFS primary points of contact for this EIS. Mr. Thompson can be contacted by telephone at (850) 234-5061, or by e-mail at Mark.Thompson@noaa.gov. Mr. Hendren can be contacted by telephone at (727) 551-5610 or by email at Ryan.Hendren@noaa.gov. Due to budgetary and manpower constraints, we anticipate their participation to be limited to meetings, teleconferences, webinars, occasional field investigations, as well as review and comment on draft documents developed to support the EIS.

Thank you for providing the opportunity to serve as a cooperating agency in the development of this EIS.

Sincerely,

Roy. E. Crabtree, Ph.D.
Regional Administrator

cc:
F/SER4
F/SER3
F/SER46 – Thompson, Beech, Swafford
F/SER – Keys

MISSISSIPPI DEPARTMENT of ARCHIVES AND HISTORY

MDAH

PO Box 571, Jackson, MS 39205-0571
601-576-6850 • Fax 601-576-6975
mdah.state.ms.us
H. T. Holmes, Director

October 27, 2011

Mr. Philip Hegji
Mobile District, Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36628-0001

RE: Notice of Initiation of Environmental Impact Statement (EIS) for the Jackson County Port Authority-Port of Pascagoula, MDAH Project Log #10-034-11, Jackson County

Dear Philip:

We have received the September 29, 2011, notice of your intention to prepare an environmental impact statement for the proposed channel widening and related projects for the above referenced undertaking, received on October 5, 2011, in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. As you know we have been and continue to be available to assist you in assessing potential impacts and avoiding adverse impacts.

If you have any questions, please call me at 601-576-6940.

Sincerely,

Greg

Greg Williamson
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Officer

U.S. Department of Homeland Security
United States Coast Guard

Commander
Eighth Coast Guard District

Hale Boggs Federal Building
500 Poydras Street, Room 1230
New Orleans, LA 70130-3396
Staff Symbol: (dpw)
Phone: (504) 671-2107
Fax: (504) 671-2137

16630
November 1, 2011

Department of the Army
Mobile District, Corps of Engineers
P.O. Box 2288
Mobile, AL 36628-0001

Dear Mr. Hegji:

This letter is in response to Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority/Port of Pascagoula, and request for specific information on resources to be used in preparation of the Environmental Impact Statement (EIS).

The Coast Guard is interested in participating as a cooperating agency on the EIS. The Coast Guard currently has 15 fixed Aids to Navigation (AtoN) structures and 11 floating AtoN in the proposed 7.22 mile stretch of channel that would potentially need to be relocated.

As outlined in my May 6, 2011 letter to you, the Coast Guard has concerns with the project as outlined and its impact to the existing AtoN. Dredging the channel solely on one side, 100 feet on the west side parallel to the existing channel centerline, would have a profound effect on the accuracy of five sets of navigational ranges (10 fixed structures) that are critical to the safe pilotage of the channel. The Coast Guard is not in a position to relocate these ranges in a timely manner and does not have funding identified for such a relocation. We ask that the dredging project, if completed, be done in a manner that does not require the relocation of the 10 range structures. A possible alternative, allowing the ranges to remain in the same place, would be to dredge 50 feet on either side of the channel to ensure that the actual centerline of the channel would not be affected. Relocating the fixed and floating aids to navigation along the channel edge can be done with Coast Guard resources at a much smaller cost.

If you or the applicants have any further questions concerning this matter, please contact Lieutenant Commander Heather Stratton at (504) 671-2112 or Heather.E.Stratton@uscg.mil.

Sincerely,

T. J. WENDT
Commander, U.S. Coast Guard
Chief, Waterways Management Branch
By Direction

Copy: Coast Guard Sector Mobile (spw)
Coast Guard Civil Engineering Unit Miami

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, AL 36628-0001

November 16, 2011

REPLY TO
ATTENTION OF
Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Application Number SAM-2011-00389-PAH, Jackson County Port Authority/Port of Pascagoula

National Marine Fisheries Service
Attention: Mr. Mark Thompson
3500 Delwood Beach Road
Panama City, Florida 32408-7499

Dear Mr. Thompson:

The U.S. Army Corps of Engineers, Mobile District (USACE) intends to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.) and the Council on Environmental Quality NEPA regulations (40 CFR Parts 1500-1 508) to assess the potential environmental impacts associated with the construction and operation of a project proposed by the Jackson County Port Authority/Port of Pascagoula (Port). The Port has filed a permit application with USACE for impacts to the existing Federal channel and jurisdictional waters of the United States under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899 and Section 103 of the Marine Protection, Research and Sanctuaries Act. The project proposed by the Port is a 100- foot widening of the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor Channel, as well as limited widening of the northern portion of the Horn Island Pass Channel to facilitate the transition between the two channel segments. The overall project purpose is to widen the existing Federal Navigation Channel to reconfigure the site to alleviate the current transit restrictions and increase travel efficiencies for vessel transit, improve safety conditions for vessel operations, improve conditions for port operations and improve habitat conditions through the beneficial use of dredged material.

Potential impacts associated with the proposed project include dredging approximately 38,137 feet (7.22 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment to widen the channel 100 feet parallel to the existing channel centerline, to the existing depth of -42 feet mean lower low water, as well as the beneficial use and placement of the dredged material. Disposal alternatives being considered include placement of a portion of the dredged material within the U.S. Environmental Protection Agency designated Pascagoula Ocean Dredged Material Disposal Site and placement of a portion of the dredged material in the designated Littoral Zone Placement Area located east and south of the barrier island.

The USACE is collecting data for the preparation of an EIS. The level of detail for our assessment will be as necessary to describe existing conditions, as well as provide analysis of future conditions due to project impacts. The intent of this letter is to request specific information with regard to Essential Fish Habitat under your purview in the project area that should be addressed for the project and any conservation recommendations that you may suggest.

As discussed in 40 CFR 1501.6, agencies with jurisdiction by law or with special expertise with respect to environmental issues to be addressed in the EIS may be cooperating agencies for the EIS. Please reply at your earliest convenience to indicate whether your agency or any of its services, bureaus or offices has any information to provide relevant to the proposed project. Should you wish to discuss the EIS or have any questions, please call me at (251) 690-3222 or email at philip.a.hegji@usace.army.mil.

Sincerely,

Philip A Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Hegji/3222/nj/PAH
Monroe/AM 1/17

File:

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, AL 36628-0001

November 16, 2011

REPLY TO
ATTENTION OF

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Application Number SAM-2011-00389-PAH, Jackson County Port Authority/Port of Pascagoula

National Marine Fisheries Service
Habitat Conservation Division
Attention: Mr. Ryan Hendren
Southeast Regional Office
263 13th Avenue South
Saint Petersburg, Florida 33701

Dear Mr. Hendren:

The U.S. Army Corps of Engineers, Mobile District (USACE) is formally requesting information to support preparation of the Environmental Impact Statement (EIS) for the Jackson County Port Authority/Port of Pascagoula proposed channel widening of the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor Channel, as well as limited widening of the northern portion of the Horn Island Pass Channel to facilitate the transition between the two channel segments (See enclosed proposed study area).

USACE is coordinating with the National Marine Fisheries Service (NMFS) to address potential concerns with regard to the proposed project. Based on a review of the endangered and threatened species (including species of concern) and critical habitats listed for Mississippi under the jurisdiction of the NMFS and the U.S. Fish and Wildlife Service's list of Federally threatened and endangered species for Jackson County, Mississippi, 17 species have been identified that may be present in the project area and under the purview of the NMFS; the West Indian Manatee (*Trichechus manatus),* Blue whale *(Balaenoptera musculus),* Finback whale *(Balaenoptera physalus),* Humpback whale *(Megaptera novaeangliae),* Sei whale *(Balaenoptera borealis)* Sperm whale *(Physeter macrocephalus),* Green turtle (*Chelonia mydas),* Kemp's ridley turtle (*Lepidochelys kempii),* Loggerhead turtle (*Caretta caretta),* Gulf sturgeon (*Acipenser oxyrhynchus desotoi),* Dusky shark (*Carcharhinus obscurus),* Night shark *(Carcharinus signatus),* Saltmarsh tominnow (*Fundulus jenkinsi),* Sand tiger shark (*Carcharias taurus)* Speckled hind (*Epinephelus drummondhayi),* Warsaw grouper *(Epinephelus nigritus)* and the Ivory tree coral (*Oculina varicosa).*

Of these 17 species listed, only one, the Gulf Sturgeon, has designated critical habitat (68 FR 13370) within the project area. Gulf sturgeon's critical habitat is divided into 14 geographic units that span the Gulf of Mexico and associated rivers and tributaries. Unit 2, the Pascagoula River and Unit 8, Lake Pontchartrain to Mississippi Sound, traverse the project area. No other species are proposed for listing or have proposed critical habitat within the project area.

Please review the above list and provide comments in reference to the proposed project and its effect on these species. In addition, if any of these species are not anticipated to occur in the project area and can be removed from the list, or if there are concerns about species not included on this list, we would like to request clarification from your office. We will be compiling a biological assessment for this project area and welcome your comments for inclusion into the EIS document.

Please reply at your earliest convenience to indicate whether your agency or any of its services, bureaus or offices has any information to provide relevant to the proposed project. Should you wish to discuss the EIS or have any questions, please call me at (251) 690-3222 or email at philip.a.hegji@usace.army.mil.

Sincerely,

Philip A Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Enclosure

Hegji/3222/nj PA+

Monroe/

File:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mississippi Field Office
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

November 29, 2011

Colonel Steven J. Roemhildt, P.E.
U.S. Army Corps of Engineers
Mobile District
P. O. Box 2288
Mobile, Alabama 36628-0001

Dear Colonel Roemhildt:

The Fish and Wildlife Service (Service) has reviewed your request for information regarding Permit Application Number SAM-2011-00389-PAH. The project proposed by the Jackson County Port Authority/Port of Pascagoula includes impacting the existing Federal Channel and waters of the United States, under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. The proposed project is located in Jackson County, Mississippi. Our comments are submitted in accordance with the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e) and the Endangered Species Act (ESA)(87 Stat. 884, as amended 16 U.S.C. 1531 et seq.).

The project proposed by the Port includes widening the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor Channel by an additional 100 feet. Additionally, the project includes limited widening of the northern portion of the Horn Island Pass Channel to facilitate the transition between the two channel segments. The overall project purpose is to widen the existing Federal Navigation Channel to reconfigure the site to alleviate the current transit restrictions and increase travel efficiencies for vessel transit, improve safety conditions for vessel operations, improve conditions for port operations and improve habitat conditions through the beneficial use of dredged material.

Anticipated impacts associated with the proposed project include dredging approximately 38,137 feet (7.22 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment to widen the channel 100 feet parallel to the existing channel centerline, to the existing depth of -42 feet mean lower low water, as well as the beneficial use and placement of the dredged material. Disposal alternatives being considered include placement of a portion of the dredged material within the U.S. Environmental Protection Agency's designated Pascagoula Ocean Dredged Material Disposal Site, and placement of a portion of the dredged material in the designated Littoral Zone Placement Area Located east and south of the barrier island.

The USACE is collecting data for the preparation of an EIS. Specifically, the USACE is requesting the Service provide detailed information on threatened and endangered species under our purview occurring in the study area that should be addressed for the project and any conservation recommendations the Service may be able to provide.

The Service offers the following comments regarding the USACE's request listed above. The threatened Gulf sturgeon (*Acipenser oxyrhynchus desotoi*) and designated critical habitat for this species is located within the study area of the proposed project. The Service and the National Marine Fisheries Service (NMFS) have jurisdictional purview over this species and designated critical habitat for this species. However, it appears that all or most of the project area will occur within NMFS jurisdiction for this species. Therefore, it is likely that NMFS will have the lead for this species.

The endangered Alabama red-bellied turtle (*Psuedemys alabamensis*) is also found within the study area for this project. The Service has limited information regarding the Alabama red-bellied turtle's range and known nesting locations. The Service does not anticipate any impacts to this species from the dredging process. However, this species should be considered during the site selection process for the beneficial use of dredged material. Specifically, should there be existing suitable habitat for nesting locations adjacent to the proposed beneficial use site, the area should be surveyed for the presence of this species and/or its nests by a qualified biologist.

The endangered West Indian manatee (*Trichechus manatus*) may occasionally be found within the study area. The USACE has best management practices for dredging activities that should provide adequate measures to prevent impacts to this species. The Service recommends these best management practices be implemented into the project plans.

Also, several species of sea turtles have been known to nest on the barrier islands in the study area. Sea turtles are within the purview of the Service when they are on land (nesting). Therefore, should any of the barrier islands or similar habitat be chosen for beneficial use disposal, surveys may be required if the work is proposed during sea turtle nesting season.

Regarding conservation recommendations, the Service recommends the Port develop (if haven't already) a long term plan for beneficially using dredged material. Factoring in sea level rise and the thousands of acres of lost estuarine habitat (marsh, barrier islands, etc.) within this area, a sustainable plan needs to be implemented to beneficially use all suitable dredged material in order to minimize future habitat loss and/or replace previously lost habitats. The USACE has documented through Mississippi Coastal Improvement Program modeling efforts that there is a correlation between the loss of barrier island habitat and the deepening and widening of navigation channels. Therefore, it should be anticipated that the proposed project will result in additional impacts to the sediment transport processes in the Mississippi Sound, which will result in additional habitat loss. This issue should be addressed in the proposed EIS, and a long term mitigation plan, including beneficially using all suitable dredged material should be implemented in order to minimize such impacts on surrounding habitats.

If you have any questions, please contact Paul Necaise of this office at (228) 493-6631.

Sincerely

Paul Necaise

For Stephen Ricks
Field Supervisor

U.S. Department of Homeland Security

United States Coast Guard

Commander
Eighth Coast Guard District

Hale Boggs Federal Building
500 Poydras Street, Room 1230
New Orleans, LA 70130-3396
Staff Symbol: (dpw)
Phone: (504) 671-2107
Fax: (504) 671-2137

5090
January 11, 2012

Department of the Army
Mobile District, Corps of Engineers
P.O. Box 2288
Mobile, AL 36628-0001

Dear Mr. Hegji:

This letter is based on today's phone conversation and provides supplementary information to my letter of November 1st, 2011 in response to Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority/Port of Pascagoula.

The Coast Guard is interested in participating as a cooperating agency on the EIS. The Coast Guard currently has 15 fixed Aids to Navigation (AtoN) structures and 11 floating AtoN in the proposed 7.22 mile stretch of channel that would potentially need to be relocated.

The Coast Guard is not opposed to the project. However, as outlined in my May 6, 2011 letter to you, the Coast Guard is concerned with the applicant's preferred alternative and its impacts on existing AtoN: dredging the channel solely on one side, 100 feet on the west side parallel to the existing channel centerline, and relocation of five sets of navigational ranges (10 fixed structures) that are critical to the safe pilotage of the channel. The Coast Guard has not budgeted for the relocation of these ranges and does not have funding identified for such a relocation. The alternative of dredging 50 feet on either side of the channel would ensure that the actual centerline of the channel would not be affected and would allow the ranges to remain in the same place. This alternative would still require the relocation of the fixed and floating aids to navigation along the channel edge.

If you or the applicants have any further questions concerning this matter, please contact Lieutenant Commander Heather Stratton at (504) 671-2112 or Heather.E.Stratton@uscg.mil.

Sincerely,

T. J. WENDT
Commander, U.S. Coast Guard
Chief, Waterways Management Branch
By Direction

RECEIVED
JAN 20 2012
By

Copy: Coast Guard Sector Mobile (spw)
Coast Guard Civil Engineering Unit Miami

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

MAR 0 5 2012

CERTIFIED MAIL #
70051820000467901961

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Chief Phyliss J. Anderson
Mississippi Band of
Choctaw Indians
Post Office Box 6010
Choctaw, Mississippi 39350

Dear Chief Anderson:

The U.S. Army Corps of Engineers (Corps), Mobile District (Mobile District), is initiating the scoping process for the preparation of an Environmental Impact Statement (EIS), as required by the National Environmental Policy Act (NEPA), for proposed permitting and/or sponsoring widening portions of the existing Pascagoula Lower Sound/Horn Island Pass/Bayou Casotte Federal Channel by dredging is provided in Enclosure 1. The dredging project is proposed to improve navigation efficiencies for continued channel operation and maintenance. The project is located within the waters of the Mississippi Sound and Pascagoula River Delta, Jackson County, Southeastern Mississippi. The action is being reviewed concurrently by the Mobile District's Planning Division as part of a study investigation and by Regulatory Division under the Corps application Number SAM-2011-00389-PAH.

The Mississippi Band of Choctaw Indians has been identified as having interest in or historical ties to the project area. A list of all tribes contacted for this action is provided as provided in Enclosure 2. The Mobile District, as a Federal agency, recognizes its unique relationship with Native American tribes. As such, this letter is sent to initiate formal Government-to-Government consultation concerning the aforementioned effort.

As per requirements outlined in Section 106 of the National Historic Preservation Act, the Mobile District must consider the effects of the proposed action on historic properties. The Pascagoula Harbor and the project area were previously surveyed for cultural resources in anticipation of the 1986 Improvement Project (Mistovich et al. 1983). In addition to the previous survey work, a complete records and historic background study of the project area was conducted by CH2MHill June 2007.

The identified Area of Potential Effect of the project contains several archaeological sites including the Big and Little Greenwood Island sites (22JA516 and 22JA618) and a post-Mexican War hospital and cemetery associated with Camp Jefferson Davis [see "*Archaeological Survey and Testing of Greenwood Island and the Bayou Casotte Proposed Port Facilities, Jackson County, Mississippi*" (Solis and Walling 1982) among others].

Examination of the sites has found a small portion (7 meters by 20 meters) of the prehistoric site 22JA516 remains intact. The midden has previously been shown to contain prehistoric human remains. The Mobile District is proposing to mitigate the prehistoric site. This letter is sent as an initiation of consultation and invitation to participate in this project.

If the Mississippi Band Choctaw Indians wishes to participate in consultation for this project, the Mobile District request you respond to this letter with your interest no later than 30 days from date of this letter. In addition, if you are aware of other tribes that may have an interest in this project, which are not already listed on Enclosure 2, we would appreciate you providing us with that information.

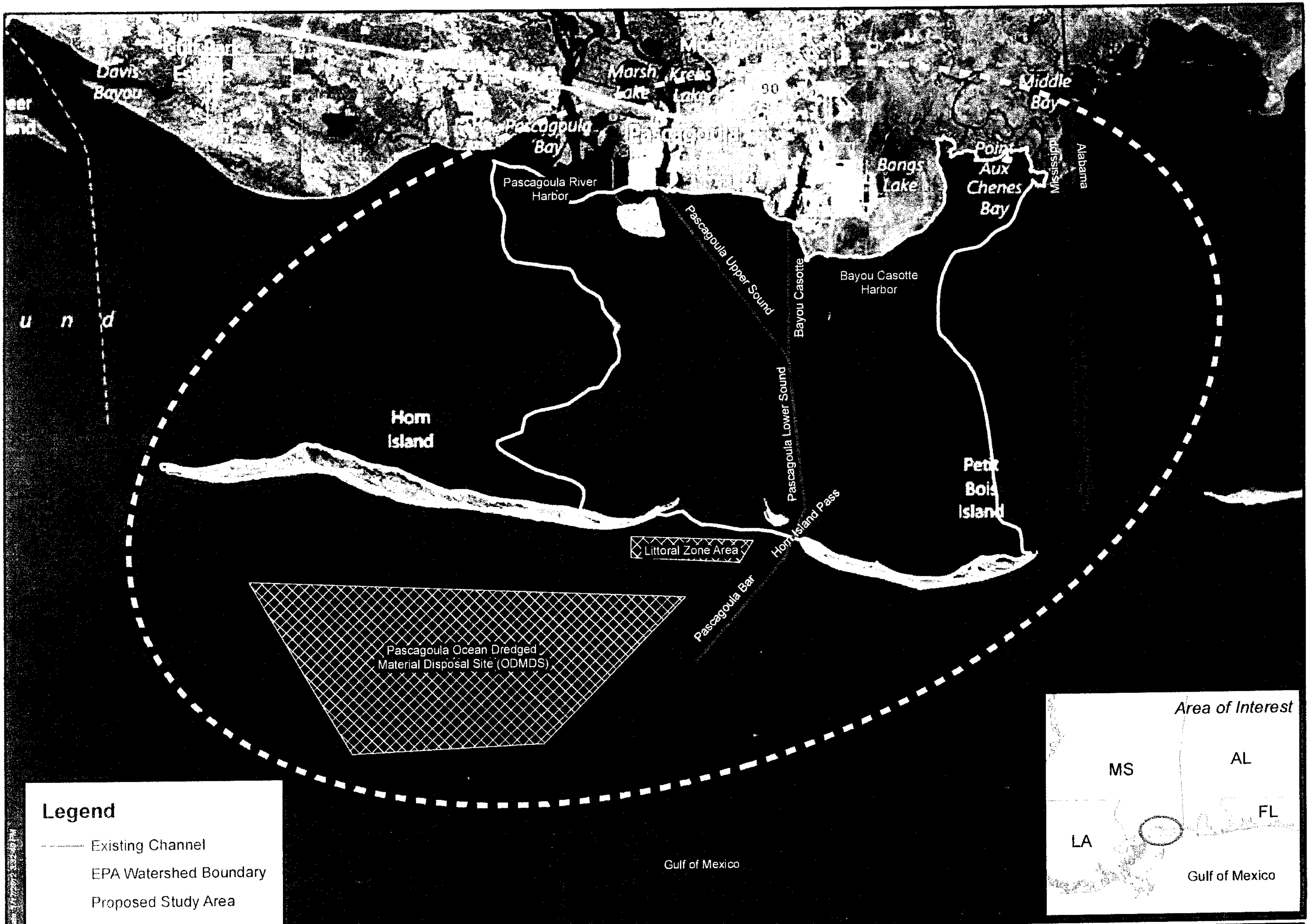
We are furnishing a copy of this letter to your Cultural Resources Contact, Mr. Kenneth H. Carleton, Mississippi Band of Choctaw Indians, Post Office Box 6257, Choctaw, Mississippi 39350. Please contact our Archaeologist, Mr. Matthew Grunewald at (251) 694-4107 or via email at matthew.m.grunewald@usace.army.mil or the Project Manager, Mr. Philip Hegji at (251) 690-3222 or via email at philip.a.hegji@usace.army.mil with any questions or interest.

Sincerely,

Steven J. Roemhildt, P.E.
Colonel, Corps of Engineers
District Commander

Enclosures

Hegji/3222/nj PH
Young/
Chief, RD-C/
Chief, RD/
OC/ 3/2
DP/
DX/
DE/
File:



US Army Corps of Engineers

Figure 1.5-1

SAM-2011-00389-PAH

Proposed Study Area

Pascagoula Lower Sound / Casotte Harbor Improvement Project

Table 1.

List of Tribes and Leader Contacted

Chief Gregory E. Pyle
Choctaw Nation of Oklahoma
Post Office Box 1210
Durant, Oklahoma 74702-1210

Mr. Ian Thompson PhD, RPA
Tribal Historic Preservation Officer, Tribal Archaeologist
Director Historic Preservation Department
Choctaw Nation of Oklahoma
Post Office Drawer 1210
Durant, Oklahoma 74701

Chief Christine M. Norris
Jena Band of Choctaw Indians
Post Office Box 14
Jena, Louisiana 71342

Mr. Mike Tarpley
Tribal Historic Preservation Officer
Post Office Box 14
Jena, Louisiana 71342

Chief Phyliss J. Anderson
Choctaw Branch
Mississippi Band of Choctaw Indians
Post Office Box 6010
Choctaw, Mississippi 39350

Mr. Kenneth H.Carleton
Mississippi Band of Choctaw Indians
Post Office Box 6257
Choctaw, Mississippi 39350

Chairman Earl J. Barbry, Sr.
Tunica-Biloxi Tribe of Louisiana
151 Melacon Drive
Post Office Box 1589
Marksville, Louisiana 71351

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

MAR 0 5 2012

CERTIFIED MAIL #
70051820000467901947

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Chairman Earl J. Barbry, Sr.
Tunica-Biloxi Tribe of Louisiana
Post Office Box 1589
Marksville, Louisiana 74702-1210

Dear Chairman Barbry:

The U.S. Army Corps of Engineers (Corps), Mobile District, is initiating the scoping process for preparation of an Environmental Impact Statement (EIS), as required by the National Environmental Policy Act (NEPA), for proposed permitting and/or sponsoring widening portions of the existing Pascagoula Lower Sound, Horn Island Pass and Bayou Casotte Federal Channel by dredging is provided in Enclosure 1. The dredging project is proposed to improve navigation efficiencies for continued channel operation and maintenance. The project is located within the waters of Mississippi Sound and Pascagoula River Delta, Jackson County, Southeastern Mississippi. The action is being reviewed and investigated concurrently by the Mobile District's Planning Division and Regulatory Division under Corps' application Number SAM-2011-00389-PAH.

The Tunica-Biloxi Tribe of Louisiana has been identified as having interest in or historical ties to the project area. A list of all tribes contacted for this action is provided in Enclosure 2. The Mobile District, as a Federal agency, recognizes its unique relationship with Native American tribes. As such, this letter is sent to initiate formal Government-to-Government consultation concerning the aforementioned effort.

As per requirements outlined in Section 106 of the National Historic Preservation Act, the Mobile District must consider the effects of the proposed action on historic properties. The Pascagoula Harbor and the project area were previously surveyed for cultural resources in anticipation of the 1986 Improvement Project (Mistovich et al. 1983). In addition to the previous survey work, a complete records and historic background study of the project area was conducted by CH2MHill June 2007.

The identified Area of Potential Effect of the project contains several archaeological sites including the Big and Little Greenwood Island sites (22JA516 and 22JA618) and a post-Mexican War hospital and cemetery associated with Camp Jefferson Davis [see "*Archaeological Survey and Testing of Greenwood Island and the Bayou Casotte Proposed Port Facilities, Jackson County, Mississippi*" (Solis and Walling 1982) among others].

Examination of the sites has found a small portion (7 meters by 20 meters) of the prehistoric site 22JA516 remains intact. The midden has previously been shown to contain prehistoric human remains. The Mobile District is proposing to mitigate the prehistoric site. This letter is sent as an initiation of consultation and invitation to participate in this project.

If the Tunica-Biloxi Tribe of Louisiana wishes to participate in consultation for this project, the Mobile District request you respond to this letter with your interest no later than 30 days from date of this letter. In addition, if you are aware of other tribes that may have an interest in this project, which are not already listed on Enclosure 2, we would appreciate you providing us with that information.

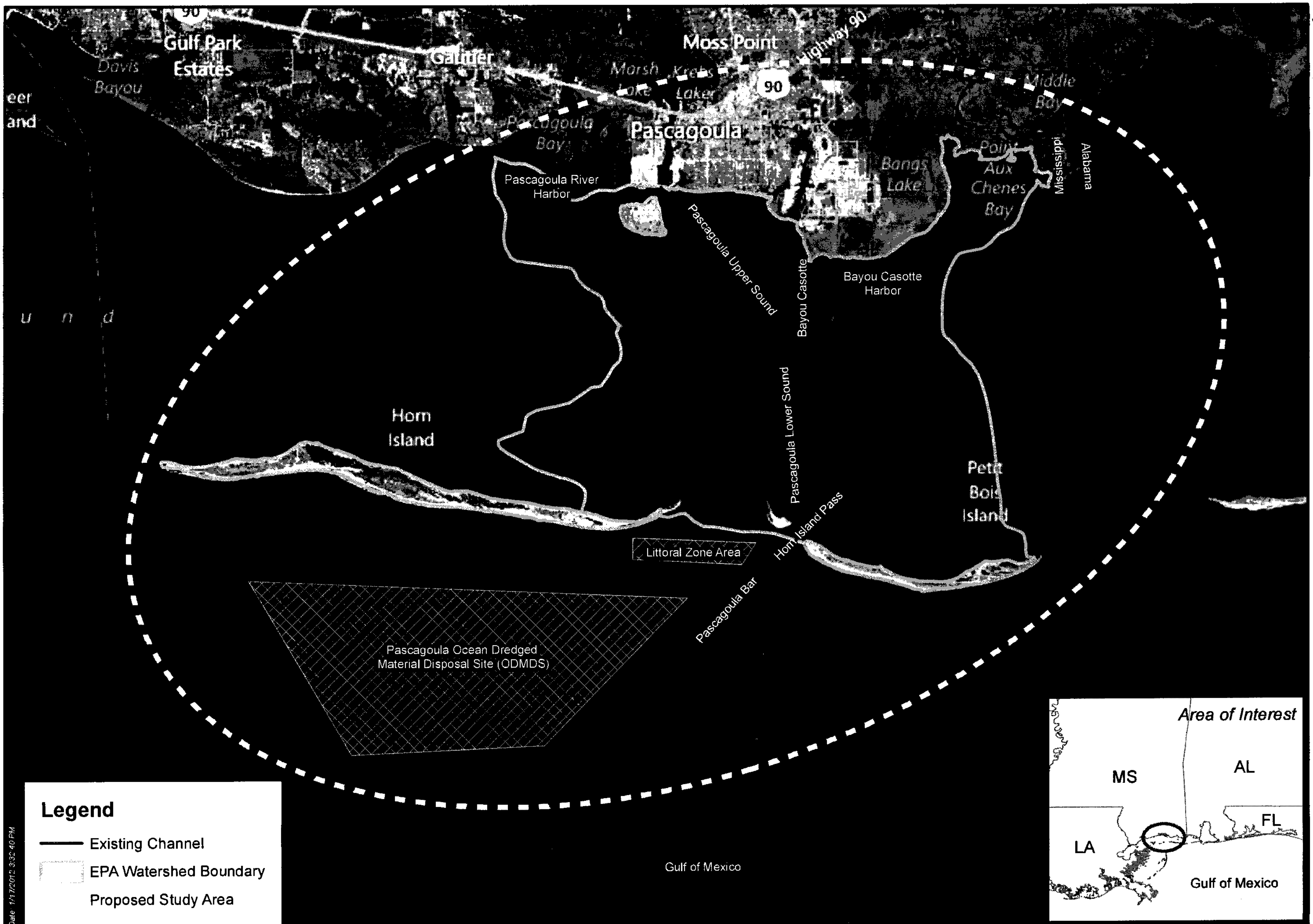
Please contact our Archaeologist, Mr. Matthew Grunewald at (251) 694-4107 or via email at matthew.m.grunewald@usace.army.mil or the Project Manager, Mr. Philip Hegji at (251) 690-3222 or via email at philip.a.hegji@usace.army.mil with any questions or interest.

Sincerely,

Steven J. Roemhildt, P.E.
Colonel, Corps of Engineers
District Commander

Enclosures

Hegji/3222/nj PAH
Young/
Chief, RD-C/
Chief, RD/ CH-P
OC/ 3/2
DP/
DX/
DE/ JN
File:



US Army Corps of Engineers
Mobile District

Figure 1.5-1

SAM–2011–00389–PAH
Proposed Study Area

Pascagoula Lower Sound / Casotte Harbor Improvement Project

N 0 4 8 Miles

List of Tribes and Leaders Contacted

Chief Gregory E. Pyle
Choctaw Nation of Oklahoma
Post Office Box 1210
Durant, Oklahoma 74702-1210

Mr. Ian Thompson PhD, RPA
Tribal Historic Preservation Officer, Tribal Archaeologist
Director Historic Preservation Department
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Chairman Earl J. Barbry, Sr.
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DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
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MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

MAR 05 2012

CERTIFIED MAIL #
70051820000467901954

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Chief Christine M. Norris
Jena Band of Choctaw Indians
Post Office Box 14
Jena, Louisiana 71342

Dear Chief Norris:

The U.S. Army Corps of Engineers (Corps), Mobile District (Mobile District), is initiating the scoping process for the preparation of an Environmental Impact Statement (EIS), as required by the National Environmental Policy Act (NEPA), for proposed permitting and/or sponsoring widening portions of the existing Pascagoula Lower Sound, Horn Island Pass and Bayou Casotte Federal Channel by dredging is provided in Enclosure 1. The dredging project is proposed to improve navigation efficiencies for continued channel operation and maintenance. The project is located within the waters of the Mississippi Sound and Pascagoula River Delta, Jackson County, Southeastern Mississippi. The action is being reviewed concurrently by the Mobile District's Planning Division as part of a study investigation and by Regulatory Division under the Corps application Number SAM-2011-00389-PAH.

The Jena Band of Choctaw Indians has been identified as having interest in or historical ties to the project area. A list of all tribes contacted for this action is provided in Enclosure 2. The Mobile District, as a Federal agency, recognizes its unique relationship with Native American tribes. As such, this letter is sent to initiate formal Government-to-Government consultation concerning the aforementioned effort.

As per requirements outlined in Section 106 of the National Historic Preservation Act, the Mobile District must consider the effects of the proposed action on historic properties. The Pascagoula Harbor and the project area were previously surveyed for Cultural Resources in anticipation of the 1986 Improvement Project (Mistovich et al. 1983). In addition to the previous survey work, a complete records and historic background study of the project area was conducted by CH2MHill June 2007.

The identified Area of Potential Effect of the project contains several archaeological sites including the Big and Little Greenwood Island sites (22JA516 and 22JA618) and a post-Mexican War hospital and cemetery associated with Camp Jefferson Davis [see "*Archaeological Survey and Testing of Greenwood Island and the Bayou Casotte Proposed Port Facilities, Jackson County, Mississippi*" (Solis and Walling 1982) among others].

Examination of the sites has found a small portion (7 meters by 20 meters) of the prehistoric site 22JA516 remains intact. The midden has previously been shown to contain prehistoric human remains. The Mobile District is proposing to mitigate the prehistoric site. This letter is sent as an initiation of consultation and invitation to participate in this project.

If the Jena Band of Choctaw Indians wishes to participate in consultation for this project we request you respond to this letter with your interest no later than 30 days from date of this letter. In addition, if you are aware of other tribes that may have an interest in this project, which are not listed on Enclosure 2, we would appreciate you providing us with that information.

We are furnishing a copy of this letter to your Tribal Historic Preservation Officer, Mr. Mike Tapley, Post Office Box 14, Jena, Louisiana 71342. Please contact either our Archaeologist, Mr. Matthew Grunewald at (251) 694-4107 or via email at matthew.m.grunewald@usace.army.mil or the Project Manager, Mr. Philip Hegji at (251) 690-3222 or via email at philip.a.hegji@usace.army.mil with any questions or interest.

Sincerely,

Steven J. Roemhildt, P.E.
Colonel, Corps of Engineers
District Commander

Enclosures

Hegji/3222/nj PA
Young/
Chief, RD-C/
Chief, RD/
OC/ 3/2
DP/
DX/
DE/ TN
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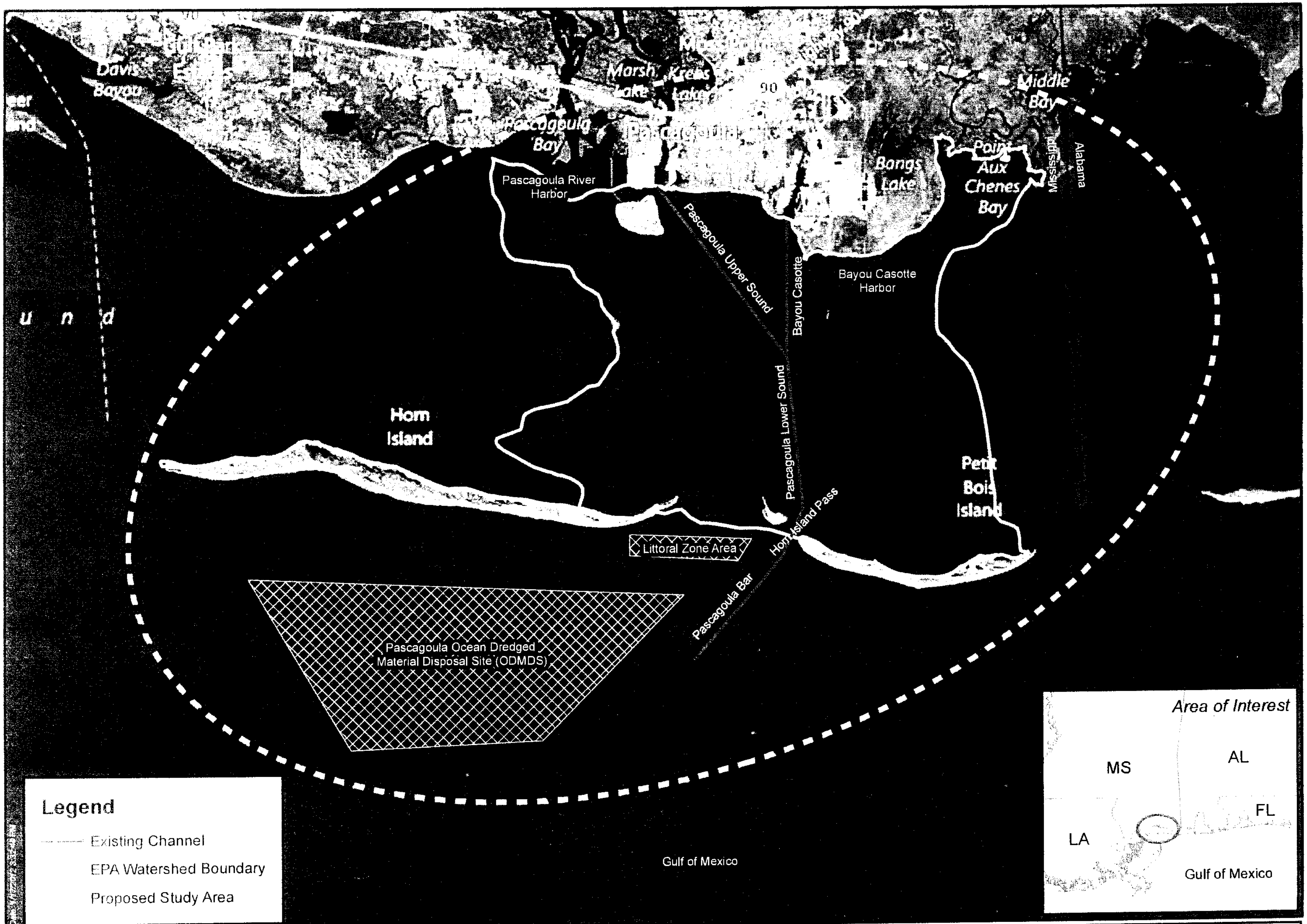

US Army Corps of Engineers

Figure 1.5-1

SAM-2011-00389-PAH

Proposed Study Area

Pascagoula Lower Sound / Casotte Harbor Improvement Project

N

0 4 8 Miles

List of Tribes and Leaders Contacted

Chief Gregory E. Pyle
Choctaw Nation of Oklahoma
Post Office Box 1210
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Mr. Ian Thompson PhD, RPA
Tribal Historic Preservation Officer, Tribal Archaeologist
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Mr. Kenneth H.Carleton
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Post Office Box 6257
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Chairman Earl J. Barbry, Sr.
Tunica-Biloxi Tribe of Louisiana
151 Melacon Drive
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Marksville, Louisiana 71351

DEPARTMENT OF THE ARMY
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MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

MAR 0 5 2012

CERTIFIED MAIL #
70051820000467901978

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Chief Gregory E. Pyle
Choctaw Nation of Oklahoma
Post Office Box 1210
Durant, Oklahoma 74702-1210

Dear Chief Pyle:

The U.S. Army Corps of Engineers (Corps), Mobile District (Mobile District), is initiating the scoping process for the preparation of an Environmental Impact Statement (EIS), as required by the National Environmental Policy Act (NEPA), for proposed permitting and/or sponsoring widening portions of the existing Pascagoula Lower Sound/Horn Island Pass/Bayou Casotte Federal Channel by dredging is provided in Enclosure 1. The dredging project is proposed to improve navigation efficiencies for continued channel operation and maintenance. The project is located within the waters of the Mississippi Sound and Pascagoula River Delta, Jackson County, Southeastern Mississippi. The action is being reviewed concurrently by the Mobile District's Planning Division as part of a study investigation and by Regulatory Division under the Corps application Number SAM-2011-00389-PAH.

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We are furnishing a copy of this letter to your Tribal Historic Preservation Officer, Mr. Ian Thompson, PhD, RPA, Tribal Archaeologist, Director Historic Preservation Department, Choctaw Nation of Oklahoma, Post Office Drawer 1210, Durant, Oklahoma 74701. Please contact our Archaeologist, Mr. Matthew Grunewald at (251) 694-4107 or via email at matthew.m.grunewald@usace.army.mil or the Project Manager, Mr. Philip Hegji at (251) 690-3222 or via email at philip.a.hegji@usace.army.mil with any questions or interest.

Sincerely,

Steven J. Roemhildt, P.E.
Colonel, Corps of Engineers
District Commander

Enclosures

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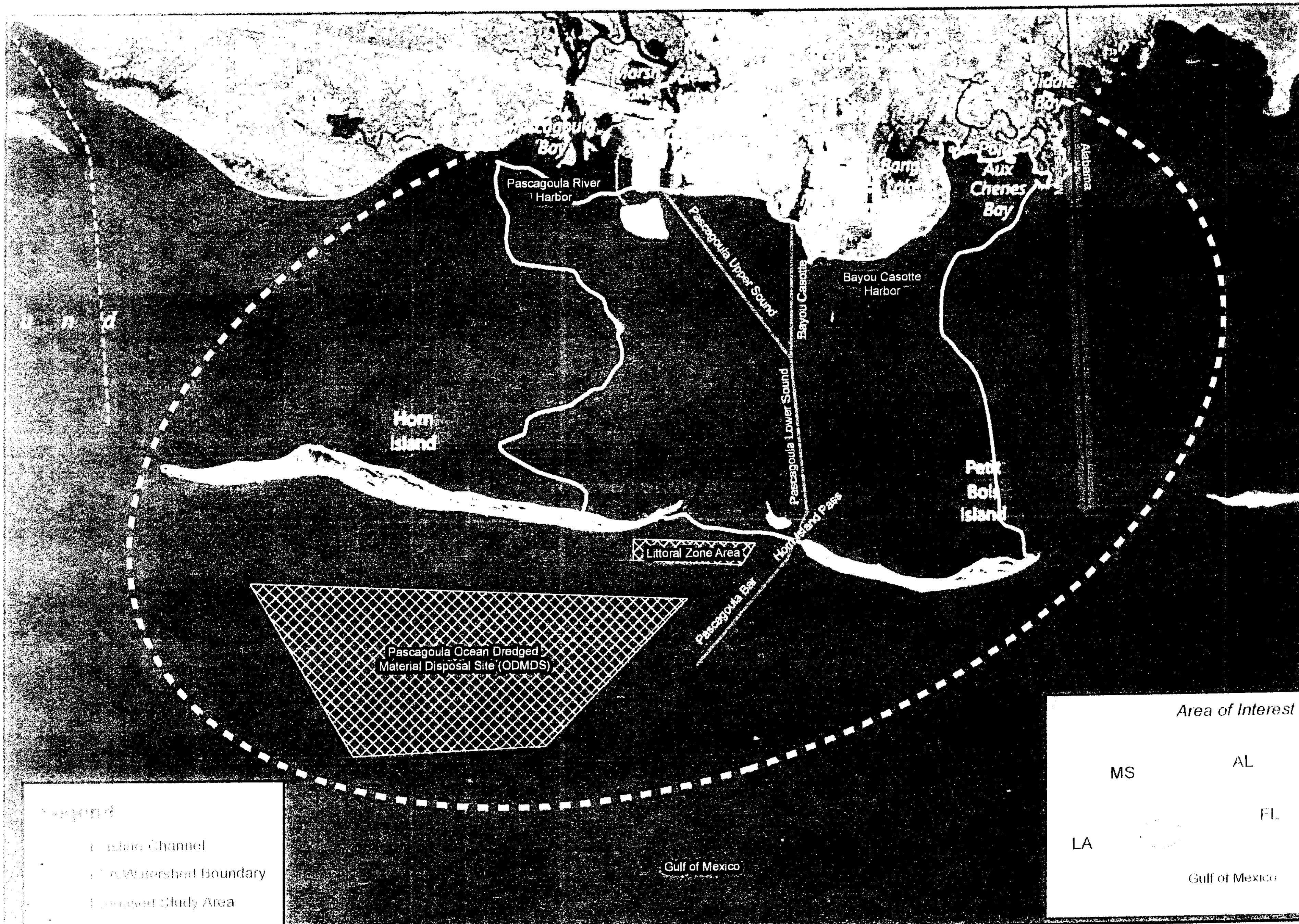

Figure 1.5-1

SAM-2011-00389-PAH

Proposed Study Area

Pascagoula Lower Sound / Casotte Harbor Improvement Project

List of Tribes and Leaders Contacted

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Tunica-Biloxi Tribe of Louisiana
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Marksville, Louisiana 71351

BIOLOGICAL ASSESSMENT
BAYOU CASOTTE AND LOWER PASCAGOULA SOUND CHANNEL WIDENING PROJECT

On behalf of:

Jackson County Port Authority – Port of Pascagoula
3033 Pascagoula Street
Pascagoula, Mississippi 39567

Prepared by

Anchor QEA, LLC
614 Magnolia Avenue
Ocean Springs, Mississippi 39564

April 2012

BIOLOGICAL ASSESSMENT BAYOU CASOTTE AND LOWER PASCAGOULA SOUND CHANNEL WIDENING PROJECT

On behalf of:

Jackson County Port Authority – Port of Pascagoula

3033 Pascagoula Street

Pascagoula, Mississippi 39567

Prepared by

Anchor QEA, LLC

614 Magnolia Avenue

Ocean Springs, Mississippi 39564

April 2012

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LIST OF ACRONYMS AND ABBREVIATIONS

Anchor QEA	Anchor QEA, LLC
B/C	benefit to cost ratio
BA	Biological Assessment
BMP	best management practice
BO	Biological Opinion
BU	Beneficial Use
cy	cubic yards
dB	decibel
DMMP	Dredged Material Management Plan
DO	dissolved oxygen
EA	EA Engineering, Science, and Technology
EFH	Essential Fish Habitat
ESA	Endangered Species Act of 1973
ESCA	Endangered Species Conservation Act
FHWA	Federal Highway Administration
FNC	Federal Navigation Channel
GIWW	Gulf Intracoastal Waterway
GRBO	Gulf of Mexico Regional Biological Opinion
GSMFC	Gulf States Marine Fisheries Commission
IMMS	Institute of Marine Mammal Studies
LPC	limiting permissible concentration
LPEAK	peak level sound measurement
LZA	Littoral Zone Area
mcy	million cubic yards
MDEQ	Mississippi Department of Environmental Quality
MLLW	mean lower low water
MMNS	Mississippi Museum of Natural Science
MMPA	Marine Mammal Protection Act of 1972
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

ODMDS	Ocean Dredged Material Disposal Site
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	primary constituent element
PDEIS	Preliminary Draft Environmental Impact Statement
PEL	probable effects level
Port	Port of Pascagoula
ppt	parts per thousand
proposed Project	Bayou Casotte and Lower Pascagoula Sound Channel Widening Project
RMS	root mean square
RPA	reasonable and prudent alternative
SAV	Submerged Aquatic Vegetation
SEL	sound exposure level
SFA	1996 Sustainable Fisheries Act
SQG	sediment quality guideline
SVOC	semivolatile organic compound
TEL	threshold effects level
TEQ	toxicity equivalency quotient
TKN	total Kjeldahl nitrogen
TN	total nitrogen
TOC	total organic carbon
TP	total phosphorus
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFDA	U.S. Food and Drug Administration
USFWS	U.S. Fish and Wildlife Service
WQC	water quality criteria

1 BACKGROUND AND PROJECT OVERVIEW

The Port of Pascagoula (Port) proposes widening of the existing Bayou Casotte and Lower Pascagoula Sound Federal Navigation Channel (FNC) segments of Pascagoula Harbor, Jackson County, Mississippi. The proposed Bayou Casotte and Lower Pascagoula Sound Channel Widening Project (proposed Project) is defined to include a 100-foot widening of these segments of the Pascagoula Harbor Channel to a depth consistent with the existing channel, as well as, bend easing at the northern intercept with the Horn Island Pass Channel to facilitate the transition between the two channel segments (Figure 1). The proposed Project will provide greater accessibility to all vessels calling on the public and private facilities located in Bayou Casotte Harbor and will provide a net benefit to vessel transit efficiency. Concurrently, the U.S. Army Corps of Engineers (USACE) is evaluating whether to assume maintenance of the completed Project under a Section 204(f) study. If the USACE evaluation is favorable, adopted, and then authorized, the proposed Project will be constructed; if not, the proposed Project may not be constructed.

To pursue the proposed Project, the Port submitted an application for USACE permits in April 2011 (SAM-2011-00389-PAH). A Draft Environmental Impact Statement (PDEIS) was prepared for the proposed Project in April 2012; this DEIS supports the regulatory process for the permit application to construct rather than the maintenance dredging under the Section 204(f) study (Atkins North America 2012). Dredging and disposal methods associated with the proposed Project are similar to current dredging and disposal methods in Mississippi Sound that have been addressed in a number of previous environmental documents including Biological Assessments (BAs) and Biological Opinions (BOs) regarding endangered and threatened species and critical habitats in the area. Information from the DEIS and other documents are largely summarized and also included by reference in this BA.

As stated above, the purpose of the proposed Project is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the south turning basin in Bayou Casotte. One key need for this project stems from the fact that the current width of the channel imposes transit limitations for marine vessel traffic that delays vessels and fosters inefficient use of the channels and harbor. Frequently, wind and current conditions restrict how vessels traversing a narrow channel. The impacts include diversions to other ports and delays offshore awaiting transit, which are not effective and efficient use of the vessel and the harbor facilities. Therefore, the proposed Project is intended to:

- Reconfigure the channel to alleviate the current transit restrictions and increase travel efficiencies for existing vessel transit.
- Improve conditions for Port operations by increasing the availability of the channel for existing vessel use under a much wider range of environmental conditions than with the existing channel.

The proposed Project is needed to reduce existing transit restrictions along Pascagoula Lower Sound and Bayou Casotte navigation channels. Because the proposed Project is being constructed to alleviate an existing transit workaround, the proposed Project is not expected to increase overall vessel traffic volumes or increase vessel sizes using the channels or harbor. New nighttime traffic is anticipated, as the restrictions currently in place could be lifted in the future, reducing congestion in the channel.

The total dredging quantity is estimated to be 3.4 million cubic yards (mcy). Dredged material management would include placement of approximately 124,000 cubic yards (cy) of the sandy dredged material in the designated Littoral Zone Area (LZA) located east and south of Horn Island, and the remainder of the material (approximately 3.3 mcy) would be placed at the Pascagoula Ocean Dredged Material Disposal Site (ODMDS) south of Horn Island (Figure 1). The open water placement areas in Mississippi Sound typically used for maintenance dredging were requested by the USACE to be shown on Figure 1 for information only and will not be utilized as part of this proposed Project.

The Endangered Species Act of 1973 (ESA) requires Federal agencies to ensure that they do not authorize, fund, or carry out actions that are likely to jeopardize the continued existence of endangered or threatened ("listed") species or result in the destruction or adverse modification of critical habitat for such species. ESA is co-regulated by the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). The ESA prohibits any "take" (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. When a proposed Federal action is found to be consistent with Section 7(a)(2) of the ESA and that action may incidentally take individuals of listed species, NMFS will issue an incidental take statement specifying the impact of any incidental taking of endangered or threatened species. The incidental take statement also provides reasonable and prudent measures that are necessary to minimize impacts, and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures. Incidental takings resulting from the agency action, including incidental takings caused by activities authorized by the agency, are exempted from the taking prohibition by section 7(o) of the ESA, but only if those takings are in compliance with the specified terms and conditions. The incidental take statement is typically included in the Biological Opinion which is prepared for a project.

This BA has been prepared to assist USACE, NMFS, and USFWS in their reviews of the permit application, and to address the potential effects of the proposed Project on listed species and designated critical habitats. Those species and critical habitats relevant to the proposed Project are summarized in Table 1 (NMFS 2012a; USFWS 2012a).

Table 1

Threatened and Endangered Species and Critical Habitat that May Occur in the Action Area*

Species	Status	Agency	Effects Determination	Critical Habitat Status	Critical Habitat Effects Determination
Fish (Marine)					
Gulf sturgeon (*Acipenser oxyrinchus desotoi*)	Threatened	NMFS	LAA	Designated (Unit 8)	NLAA
Marine Mammals					
Blue whale (*Balaenoptera musculus*)	Endangered	NMFS	NE	None	NA
Finback whale (*Balaenoptera physalus*)	Endangered	NMFS	NE	None	NA
Humpback whale (*Megaptera novaeangliae*)	Endangered	NMFS	NE	None	NA
Sei whale (*Balaenoptera borealis*)	Endangered	NMFS	NE	None	NA
Sperm whale (*Physeter macrocephalus*)	Endangered	NMFS	NE	None	NA
West Indian manatee (*Trichechus manatus*)	Endangered	USFWS	NLAA	None	NA
Sea Turtles					
Green sea turtle (*Chelonia mydas*)	Threatened	NMFS	LAA	Designated, not in Gulf of Mexico	NA
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered	NMFS	LAA	Designated, not in Gulf of Mexico	NA
Kemp's ridley sea turtle *(Lepidochelys kempii)*	Endangered	NMFS	LAA	Designated, not in Gulf of Mexico	NA
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	NMFS	NLAA	Designated, not in Gulf of Mexico	NA
Loggerhead sea turtle (*Caretta caretta*)	Threatened	NMFS	LAA	Designated, not in Gulf of Mexico	NA

Sources: NMFS 2012a; USFWS 2012a

Notes:
LAA = Likely to Adversely Affect
NA = Not Applicable
NE = No Effect
NLAA = Not Likely to Adversely Affect
*Action Area = area to be affected directly or indirectly by the Federal action (see Section 2.7)

The proposed Project effects that will occur during construction which could impact the listed species and critical habitats include elevated noise, water quality effects, direct habitat effects, entrainment associated with dredging impacts from channel widening, benthic disturbance due to disposal of dredged material, and benthic disturbance related to relocation of aids to navigation to accommodate the wider channel (e.g., center line range markers). Conservation measures will be employed to minimize these effects. Noise and water quality impacts would be temporary and short-term due to the dispersive influence of the wind, current, and tidal fluctuations within the Action Area. Direct habitat impacts and effects to benthic invertebrates will occur, but are expected to be insignificant to listed species and critical habitats because the proposed Project is located adjacent to an existing FNC and recolonization of disturbed areas with benthic species is expected to occur (Atkins North America 2012). Channel widening is anticipated to have a negligible, long-term effect on the average salinity and will have no adverse impacts on the freshwater-saltwater mixing zone in the Mississippi Sound (Atkins North America 2012). Effects on other water quality parameters, including water temperature, dissolved oxygen (DO), and total suspended solids (TSS as a surrogate for turbidity), are also expected to be temporary and minor during dredging (CH2M HILL 2010; USACE 2009; Atkins North America 2012) and insignificant to listed species and critical habitat in the Action Area. Disposal of dredged material will occur in permitted areas that contribute to longshore sediment drift in the area of the barrier islands. No impacts to seagrass or other submerged aquatic vegetation (SAV) is anticipated. Potential entrainment during dredging activity is the most significant potential impact to listed species or critical habitats associated with the proposed Project.

This BA provides an evaluation of the effects of the proposed Project on Essential Fish Habitat (EFH) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the 1996 Sustainable Fisheries Act (SFA). The EFH effects analysis and conclusions are presented in (Anchor QEA 2012b). The species addressed in this BA and the effects determination for each are listed in Table 1. The effects determinations provided in Table 1 have been developed to be consistent with the *Final ESA Section 7 Consultation Handbook* (USFWS and NMFS 1998). Terrestrial and freshwater aquatic species listed by the USFWS as potentially present in Jackson County are not addressed because the entire proposed Project is within the marine environment of Mississippi Sound. These species are identified in

Table 2. There are no listed, proposed, or candidate terrestrial or freshwater aquatic species that could be potentially impacted by the proposed Project.

Table 2

Threatened and Endangered Terrestrial and Freshwater Aquatic Species and Critical Habitats that Occur in Jackson County but Would Not be Present in the Action Area

Species	Status	Agency	Effects Determination	Critical Habitat Status	Critical Habitat Effects Determination
Amphibians					
Mississippi gopher frog (*Rana capito sevosa*)	Endangered	USFWS	NE	None	NA
Birds					
Mississippi sandhill crane (*Grus canadensis pulla*)	Endangered	USFWS	NE	Designated, not in Action Area	NA
Piping plover *(Charadrius melodus)*	Threatened	USFWS	NE	Designated, not in Action Area	NA
Red-cockaded woodpeckers (*Picoides borealis*)	Endangered	USFWS	NE	None	NA
Mammals					
Louisiana black bear (*Ursus americanus luteolus*)	Threatened	USFWS	NE	None	NA
Reptiles					
Alabama red-bellied turtle (*Pseudemys alabamensis*)	Endangered	USFWS	NE	None	NA
Eastern indigo snake (*Drymarchon corais couperi*)	Threatened	USFWS	NE	None	NA
Gopher tortoise (*Gopherus polyphemus*)	Threatened	USFWS	NE	None	NA
Yellow-blotched map turtle (*Graptemys flavimaculata*)	Threatened	USFWS	NE	None	NA
Plants					
Louisiana quillwort (*Isoetes louisianensis*)	Endangered	USFWS	NE	None	NA

Sources: NMFS 2012a; USFWS 2012a

Notes:
NA = Not Applicable
NE = No Effect
Action Area = area to be affected directly or indirectly by the Federal action (see Section 2.7)

2 PROJECT DESCRIPTION

This section provides the proposed Project location and setting, a description of the work elements, and additional considerations important to the proposed Project.

2.1 Project Location and Setting

The Port is located in southeastern Mississippi on the Mississippi Sound in/adjacent to the City of Pascagoula in Jackson County, Mississippi, south of the intersection of Interstate Highway 10 and Mississippi Highway 63 (Figure 1). The Port facility includes two harbors: the Pascagoula River Harbor and the Bayou Casotte Harbor. Both harbors include berthing and docking facilities for loading and unloading vessels, vessel repair, and construction. Mississippi Sound extends from Lake Borgne, Louisiana, to Mobile Bay, Alabama, and is geographically separated from the Gulf of Mexico by a series of narrow islands and sand bars. Bayou Casotte Harbor and Pascagoula River Harbor are accessible via navigation channels which extend approximately 18 miles offshore from the Port. The navigation channel enters Mississippi Sound from the Gulf of Mexico, passes between Horn Island and Petit Bois Island, crosses the Gulf Intracoastal Waterway (GIWW), and then branches into two channel segments that provide access to the Bayou Casotte and Pascagoula River harbors. The eastern channel (i.e., Lower Sound Channel) leads to the Bayou Casotte Harbor and the western channel (i.e., Upper Sound Channel) leads to the Pascagoula River Harbor (Figure 1).

2.2 Project Footprint and Action Area

The proposed Project footprint is the geographic area that includes the physical boundaries of the construction footprint, the areas of channel widening, and dredged material placement (Figure 2). The proposed Project footprint is a portion of the Action Area. The proposed Project footprint includes the following:

- Bayou Casotte and Lower Pascagoula Sound/FNC segments proposed for widening
- The following potential dredged material placement sites:
  - LZA Beneficial Use (BU) site (south and east of Horn Island)
  - Pascagoula ODMDS

The Action Area is defined as the area to be affected directly or indirectly by the Federal action. In this case, the Federal action is the issuance of the USACE permit for the proposed Project. The Action Area considers the effects of interrelated and interdependent activities and includes the geographic extent of the effects resulting from the proposed Project. USFWS interprets the Action Area to include the extent of effects of the proposed Project on the environment. NMFS interprets the Action Area as the area where effects to listed species are expected to occur. The geographic extent of the Action Area was defined by the farthest geographic reach of the proposed Project actions that may lead to potential impacts on listed species.

Potential impacts from dredging and relocation of navigation markers and ranges include both underwater and in-air noise, turbidity and resuspended sediments, entrainment, and changes to prey distribution and abundance. The proposed dredging and dredged material placement will occur in and near an active marine transportation zone, and as a result, noise generated from dredging and related activity is not anticipated to exceed typical background noise in the Action Area. The farthest reaching effect from the proposed Project is likely to be turbidity and resuspended sediments; thus, the in-water portion of the Action Area is defined by the limits of turbidity. The Mississippi Department of Environmental Quality (MDEQ) identifies a 750-foot distance for mixing zones (MDEQ 2007). A 1,000-foot buffer from the proposed Project footprint has been identified to fully encompass the MDEQ mixing zone; therefore, the Action Area is set to meet the 1,000-foot buffer from the dredge removal and disposal area footprints. Conservation measures will be used to control the levels of turbidity created by the proposed Project and turbidity and other water quality parameters will be monitored to ensure construction activities are in compliance with MDEQ requirements. The Action Area boundary is shown on Figure 2.

2.3 Proposed Project

The proposed Project occurs in the marine environment of Mississippi Sound, and consists of in-water work associated with widening the existing FNC, including excavation via dredge equipment, relocation of the dredged material, and relocation of aids to navigation. No inland or upland activities are proposed (Figure 2).

Currently, the existing Bayou Casotte and Lower Sound Channel segments are maintained at a depth of -42 feet below mean lower low water (MLLW) and a width of 350 feet. During a dredging event, 2 feet of advanced maintenance and 2 feet of allowable overdepth may be dredged to allow for the vertical inaccuracies of the dredging process. As part of the proposed Project, an additional 100 feet will be added to the overall width of the existing Bayou Casotte and Lower Sound and Bayou Casotte segments to the lower turning basin for approximately 7.2 miles. The 100 feet of additional channel width will occur on the west side of the existing channel. The proposed Project is needed to reduce existing transit restrictions along Pascagoula Lower Sound and Bayou Casotte navigation channel (see Section 1 for description of existing transit issues). The proposed Project will improve habitat conditions along the barrier islands through the beneficial use of the sand component of the dredged material.

In a parallel process, eighteen alternatives for the proposed Project width are being reviewed by the USACE Civil Works Section 204(f) feasibility study process. As part of that study, the USACE evaluates the benefit to cost (B/C) ratio for maintaining alternative channel widths and describes the environmental impacts in a draft EIS. Their economic analyses will identify the National Economic Development plan that maximizes the B/C ratio. Based on the USACE initial evaluation, the Port evaluated how each alternative fulfilled the needs of the proposed Project; they eliminated several alternatives from consideration for the proposed Project. The alternatives retained by the Port include widening 100 feet to the west of or 50 feet on either side of the existing FNC. The alternative evaluated in this BA is the identified preferred alternative for the proposed Project, widening 100 feet on the west side of the existing FNC.

In addition to the dredging, four existing U.S. Coast Guard (USCG) center line range markers and the aids to navigation along the west side of the channel would require relocation. No active pipeline relocations are anticipated. A spare line was installed in the same open trench as the 12-inch active line, when constructed in the 1960s. The spare line may be removed from the trench as part of the dredging process if the line is not deep enough across the channel limits.

The total dredging quantity is estimated to be 3.4 mcy (Table 3). The dredged material will be placed in the designated LZA and the ODMDS south of Horn Island (Figure 2). Total dredged material excavation areas and volumes are shown in Table 3, based on February 2012 USACE design plans. Total dredged material disposal areas and volumes are shown in Table 4.

Table 3
Channel Widening Impact Area and Dredge Areas and Volumes

Location of Channel Widening	Length (feet)	Width (feet)	Area (square feet)	Area (acres)	Volume (cy)
Upper Sound	14,300	100	1,431,000	32.86	1,359,464
Lower Sound	18,015	100	1,801,000	41.36	1,711,433
Transition Area	4,265	70	298,550	6.86	283,625
Horn Island Pass Bend Easing Area	165	50	4,125	0.1	31,616
Total	**36,745**	**NA**	**3,534,675**	**81.18**	**3,386,100**

Note:
cy = cubic yards

Table 4
Dredged Material Disposal Areas and Volumes

Location of Channel Widening	Volume (cy)	Deposit Thickness (feet)	Area (square feet)	Area (acres)
LZA Placement Area (Beneficial Use)	124,411	2	1,679,544	38.56
ODMDS Placement Area	3,261,700	3	30,475,332	699.62
Total	**3,386,100**	**NA**	**32,154,876**	**738.18**

Notes:
cy = cubic yards
LZA = Littoral Zone Area
ODMDS = Ocean Dredged Material Disposal Site

2.4 Construction Methods

Dredging activities would be performed by one of the following three options:

- Hopper dredge
- Mechanical dredge
- Hydraulic cutter head dredge

Placement methods are dependent on the dredging method chosen. Hopper dredges are self-propelled and capable of storing, transporting, and placing the dredged material at a given location. With mechanical dredges, the sediments are excavated with a bucket (e.g., clamshell) and placed into split-hull or bottom dump barges, which are then transported to the placement site, emptied, and returned to the dredging site for reloading. Hydraulic cutter head dredges transport and discharge the excavated sediment slurry through a pipeline to the intended placement location. Typically, pipeline length and path, sea conditions, and fuel consumption are limiting factors for hydraulic dredging. A maximum distance of 2 miles can be achieved under normal conditions; however, the distance can be increased to more than 20 miles through the use of booster pumps (Welp 2011; Shiner Moseley and Associates 2005). The discharge pipe termination point can be controlled by a spill barge that adjusts and tracks the placement location during dredging. As distances increase, so do fuel consumption and potential leaks of water and dredge slurry from the dredge pipe joints.

The proposed Project will require relocating all of the aids to navigation along the west side of the channel, as well as, four center line range markers. The markers are either a single wooden pile structure with a numbered board and light, or a lighted steel or composite buoy anchored with a concrete weight and steel chain, adjacent to the channel. The four range markers each consist of five wooden piles with a platform to support a metal tower. The center line signage is attached to the metal tower.

The center line range markers will be removed as the dredging proceeds and will be replaced after the channel segment is complete, either as part of routine maintenance of the markers by the USCG or by the construction contractor. The piles will be removed with a crane and reinstalled using impact pile driving. The channel buoys and anchors will be moved by a barge-mounted crane and re-positioned based on the construction operation and completion.

The center line range markers will be relocated approximately 50 feet west of their existing locations, re-using the salvageable materials. The construction period is approximately 18 hours per structure. Driving the piles will require 20 minutes per pile, with a cumulative duration of 100 minutes.

2.5 Construction Sequencing

Dredging activities are anticipated to occur in 2015. Construction sequencing has not been developed at this stage of the proposed Project. Based on the successful mitigative measures to protect the turtle and sturgeon species that were used during the Gulfport and other navigation channel widening projects, dredging would occur during approved work windows, as identified in the following section.

2.6 Work Windows to Protect ESA-Listed Species

Work windows have been established within the Gulf of Mexico for minimizing impacts to Gulf sturgeon and sea turtles (e.g., NMFS 2007). Working within these windows, to the extent feasible, will help reduce impacts to listed species. The following construction work windows will be implemented as part of the proposed Project:

- For Gulf sturgeon, dredging will not be restricted from November through March, when presence is most likely in the Gulf of Mexico. A full-time qualified NMFS observer will be required, if a hopper dredge is utilized.
- For sea turtles, hopper dredging activities within 1 nautical mile of the Horn Island Pass segment will be scheduled between December 1 and March 31, when sea turtle abundance is at its lowest in the Gulf of Mexico.
- When hopper dredging is used between April 1 and November 30 near the Horn Island Pass segment, a full-time qualified NMFS observer and relocation trawling will be required.

2.7 Conservation Measures

Conservation measures are defined as actions "…to benefit or promote recovery of listed species that are included by the Federal agency as an integral part of the proposed action." (USFWS and NMFS 1998). These actions may be undertaken by the agency or applicant and minimize or compensate for project effects on the species under review. These may include actions taken prior to the initiation of consultation or actions that the agency or application have committed to complete in a biological assessment or similar document. The remainder of this section provides an overview of conservation measures implemented for similar projects in the region as well as proposed conservation measures.

Documented incidental takes of loggerhead, green, and Kemp's ridley sea turtles have occurred during dredging in more than 38 coastal channels from the Texas-Mexico border through New York since 1980. During the past 24 years, the USACE and dredging industry have worked to develop protocols, operational methods, and modified dredging equipment to reduce dredging impacts to sea turtles. The success of these protection efforts is illustrated in the reductions in incidental takes compared to the increasing number of dredged channels monitored (USFWS and NMFS 2009).

Engineering and biological studies have been completed to develop a suite of protective tools to reduce hopper dredging impacts on sea turtles (USACE sea turtle data warehouse; http://el.erdc.usace.army.mil/seaturtles/). These investigations have included sea turtle relative abundance, behavioral studies, acoustic detection and dispersal, and dredging equipment development. These data allow for increased understanding of sea turtle biology and help establish conservation measures, such as those described in this section.

Existing NMFS BOs on hopper dredging in the U.S. South Atlantic and Gulf of Mexico waters (most recently, January 9, 2007, Gulf Coast Regional Biological Opinion [GRBO] to the USACE's four Gulf of Mexico districts) have established that non-hopper type dredging methods have discountable effects on and are not likely to adversely affect currently listed sea turtles (National Ocean and Atmospheric Administration [NOAA] 2003).

A hopper dredge may be used within any portion of the proposed Project footprint. Hopper dredges are known to adversely impact Federally listed species (i.e., sea turtles and Gulf sturgeon) by entrainment in the suction dragheads (NOAA 2003). While the GRBO applies to maintenance dredging and widening of Federally authorized improvements, this proposed Project is not included, because the widening is beyond the authorized dimension. However, the terms and conditions set forth in the GRBO to protect listed species will be implemented if hopper dredging is used on the proposed Project. Conservation measures that will be implemented as part of the proposed Project to protect Federally listed species and habitats include the following:

- Use of hydraulic and mechanical dredges to minimize sea turtle entrainment.
- Use of inflow screening and overflow screening to reduce sea turtle entrainment (when hopper dredges must be used).
- Use of dragheads equipped with sea turtle non-slotted deflector devices.
- Passing 100 percent of the material dredged through 4-inch screening boxes for evaluation by a NMFS-approved observer for evidence of protected species interactions.
- 100 percent monitoring of the hopper spoil, screening, and dragheads coverage aboard the dredge by NMFS-approved observers.
- Dredging pumps disengaged by the operator when the dragheads are not on the bottom to avoid entrainment.
- Temporarily stopping operations if injured, sick, or dead listed species are observed in the Action Area by the NMFS-approved observers.
- The Port will follow appropriate notification protocol for any injured, sick, or dead species as described in permits issued for the proposed Project.

In addition, relocation trawling can be used to capture and move sea turtles and Gulf sturgeon prior to dredging. A boat equipped with nets could precede the dredge head to capture Gulf sturgeon and sea turtles and then release them out of the way of the dredge path. This method has been successful in the Gulf of Mexico in reducing take of sea turtles and Gulf sturgeon (USFWS and NMFS 2009) and most recently in the completed Gulfport Harbor Channel Expansion that was completed in October 2011. In this project, the FNC was maintained and widened by three different hopper dredges. Based on the summary provided on the USACE Sea Turtle Data Warehouse, there were 403 dredging days, removing 7,321,000 cubic yards of dredged material, resulting in only one turtle take, relocation of 97 turtles, and one sturgeon, as part of the relocation trawling and dredging.

3 ENVIROMENTAL BASELINE IN ACTION AREA

The environmental baseline in the Action Area is described based on physical, chemical, and biological indicators. Because all of the proposed activity is in-water work and no upland or inland work is proposed, the following sections describe the baseline conditions within the marine environment of Mississippi Sound in the vicinity of the proposed Project.

3.1 Physical Indicators

3.1.1 Substrate

Previous investigations (EA Engineering, Science, and Technology [EA] 2011a, 2011b) characterized the sediments from the area of the proposed Project footprint. As part of the bulk sediment testing performed for the sediment characterization (EA 2011b), the physical characteristics (i.e., grain size, specific gravity, and percent solids) were analyzed. The sediment analyzed from along the Bayou Casotte Channel exhibits high silt and clay fraction (ranges from 70.2 percent to 97.5 percent). A greater variation is seen in the sediments sampled along the Lower Sound Channel, which ranged from 65.5 to 92.2 percent silt and clay, and the two samples near Horn Island exhibit a sand fraction that is greater than the other sample locations (85 to 91 percent). In general, the geotechnical analyses indicate that approximately 90 percent of the proposed material is silts and clays, with increasing amounts of sand closer to the barrier island chain (EA 2011b). Total organic carbon (TOC) concentrations ranged from 1 to 1.82 percent in the Bayou Casotte Channel sediments and 0.08 to 0.90 percent in the Pascagoula Lower Sound locations (EA 2011a).

3.1.2 Flows, Currents, and Saltwater/Freshwater Mixing

Mississippi Sound receives high saline waters from the Gulf of Mexico and freshwater from the contributing streams/rivers, which drain approximately 20,000 square miles of land area (USACE 1984). The Pascagoula River is the largest freshwater contributor near the proposed Project, but the smaller Jordon, Wolf, and Biloxi rivers also add flow. Overall salinity levels tend to be predominantly influenced by the Gulf except during high inflow periods (Jarrell 1981; Orlando et al. 1993). This mixture of freshwater runoff and saline waters creates a dynamic estuarine ecosystem (USACE 2009). Storm surges can transport large quantities of higher salinity waters into the Sound while heavy rains can reduce salinity in the Sound.

Because the barrier island system is relatively open, water passes into the Sound through the deep passes between barrier islands with the help of tidal forces. Tides in the Sound average 1.4 feet and exhibit a mixed diurnal semidiurnal pattern. Spring tides often exceed a range of 2.0 feet and neap tides may be less than 0.1 foot in range. The tides are a complex mixture of the Gulf tide and a partial reflection of the tidal waves from the barrier islands (Seim et al. 1987). In addition to freshwater inflows and tidal oscillations, winds can play an important role in water movement. Strong southerly or onshore winds associated with low pressure systems can bring in additional water from the Gulf and produce high water levels nearshore.

Typical water depths in the northern and western portion of Mississippi Sound are shallow, ranging from approximately 3 to 9 feet (Blumberg et al. 2000). Where the Pascagoula Harbor Navigation Channel extends across the eastern Mississippi Sound, water depths are approximately 13 feet or less. Depths in the southern half of the Sound range from approximately 13 to 20 feet.

The Pascagoula Harbor Navigation Channel passes between Horn Island and Petit Bois Island through Horn Island Pass. The islands are separated by approximately 3 nautical miles of open water, which range in depth from 1 to 20 feet. South of Horn Island, natural depths range from approximately 20 to 45 feet in the vicinity of the ship channel. Based on existing data (NOAA 2008; USACE 2012), the bathymetry of the Action Area varies from -10 feet MLLW in the upper and middle regions to -20 feet MLLW near the barrier islands. Below Horn and Petit Bois Islands, the bathymetry varies from -10 feet MLLW to -50 feet MLLW in the vicinity of the Pascagoula ODMDS.

The LZA is located between the -14-foot-depth and -22-foot-depth contours southeast of the east end of Horn Island. The Pascagoula ODMDS is an area of approximately 18.5 square miles, with depths varying from approximately 30 feet in the north to more than 60 feet in the southern section.

Throughout these depths, a recent study of salinity in the Action Area (Bayou Casotte and Pascagoula Navigation Channels) reported that values ranged between 3.9 and 33.9 parts per thousand (ppt) with an average of 25.3 ppt (USEPA 2011, USACE 2011e). Findings support evidence of two major phenomena with respect to salinity. First, at water depths less than 5 feet, salinities range from less than 5 to greater than 30 ppt. Second, at water depths greater than 5 feet, salinities tend to stay above 20 ppt (MDEQ 2007). These data suggest that the Action Area can be characterized by a polyhaline water mass at depths greater than approximately 5 feet, while surface waters can vary (dependent upon rainfall) between oligohaline and polyhaline conditions. At times when surface waters are fresher, bottom waters most likely will still have higher salinities, which can help set up density stratification (MDEQ 2007). MDEQ has no water quality criteria for coastal water salinity (MDEQ 2007).

3.2 Chemical Indicators

3.2.1 Water Quality

As stated above, water dynamics within Mississippi Sound are influenced by several factors, including the discharge of freshwater from rivers, seasonal or storm-induced effects, and variations in tides and currents (USACE 2011a). In general, the primary drivers are the tributaries (including the Pascagoula River) that flow into the Sound. Freshwater inputs provide nutrients and sediments that serve to maintain productivity both in the Sound and in the salt marsh habitats bordering the Sound. The salt marsh habitats regulate the discharge of nutrients to coastal waters, and trap sediments and sediment-bound constituents. Suspended sediments enter the Sound from freshwater sources, but are hydraulically restricted from the Gulf of Mexico, due to the presence of the barrier islands. The barrier islands, combined with the Sound's shallow depth and mixing from wind, tides, and currents, promote re-suspension of sediments. These suspended sediments give Mississippi Sound water a characteristic brownish color (MDEQ 2006).

Recent water temperature investigations in the Bayou Casotte and Pascagoula Navigation Channels, determined that temperatures ranged between 63 and 90 degrees Fahrenheit (°F) with an average temperature of 82 °F (USEPA 2011; USACE 2011a). These readings are in compliance with state standards. DO was evaluated in the same study and values ranged between 0.6 and 9.9 mg/L, with an average of 6.0 mg/L (USEPA 2011; USACE 2011a). All the samples collected in the study area were instantaneous, and therefore the daily average standard was not an appropriate metric to use for comparison to MDEQ water quality standards. However, using the instantaneous reading standard, 39 of the 314 DO samples, regardless of water depth, fell below 4.0 mg/L indicating insufficient DO in 12 percent of the samples analyzed. Additionally, 23 of the 87 bottom water samples fell below 4.0 mg/L, which included five of the bottom water samples with values below 2.0 mg/L indicating hypoxic conditions are present at times.

TSS values at various depths also were evaluated in these recent studies, and ranged between 0 mg/L and 88 mg/L, with an average value of 24.3 mg/L (USEPA 2011). There is no quantitative MDEQ water quality standard for TSS (MDEQ 2007). The same study evaluated total nitrogen (TN) and total phosphorus (TP), finding TN concentrations ranging between 0.02 and 0.83 mg/L, with an average value of 0.56 mg/L, and TP ranging between 0.02 and 0.19 mg/L, with an average value of 0.06 mg/L.

Other water chemistry analytes have also been investigated. Unionized ammonia has been analyzed in a Total Maximum Daily Load (TMDL) study in Bayou Casotte, and while exceedences of criteria were found, the areas being considered for channel widening were determined not to be impaired (USEPA 2007). More recently, USACE evaluated site water and standard elutriates and found that ammonia exceeded calculated acute and chronic criteria in Bayou Casotte and the Pascagoula Lower Sound channel (USACE 2010). In the standard elutriates, total Kjeldahl nitrogen (TKN) concentrations ranged from 11.3 to 41.9 mg/L, total organic carbon (TOC) concentrations ranged from 1.2 mg/L to 5.1 mg/L, and TP concentrations ranged from 0.046 mg/L to 0.17 mg/L. Water quality criteria are not available for TKN, TOC, or TP. Sulfide was detected in one standard elutriate at a concentration of 0.88 mg/L which exceeds the USEPA chronic criterion (0.002 mg/L). Nitrate and nitrite were not detected in the ambient water or standard elutriates from the channels (USACE 2011a), as would be expected for anoxic sediments at the bottom of a deep channel. Cyanide was not detected in either of the ambient water samples, and there was only one detection of cyanide in the elutriate samples (1.6 μg/L) which also exceeded the USEPA saltwater acute and chronic criteria for aquatic life.

USACE (2011a) also investigated metals, pesticides, and other contaminants in the Pascagoula Harbor Navigation Channel. Two metals, copper and nickel, exceeded USEPA saltwater water quality criteria in standard elutriate samples. Polycyclic aromatic hydrocarbons (PAHs) were detected in various locations, but were also present in ambient water in Bayou Casotte Channel and in the Pascagoula Lower Sound. Polychlorinated biphenyls (PCBs) were infrequently detected in ambient or standard elutriate samples and were generally below the reporting limit. Chlorinated pesticides were detected in ambient water samples, but were below water quality criteria; criterion were exceeded in elutriate samples for three pesticides (4,4'-DDT, endrin, and heptachlor). Dioxins and furans were detected, but were generally below the reporting limit.

MDEQ beach monitoring data and samples from 2011 showed that fecal coliform and *Enterococci* concentrations exceeded standards for a recreational use designated waterbody (MDEQ 2011).

3.2.2 Sediment Quality

Sediment quality analytes have been investigated in the Bayou Casotte channel in several instances and for various projects. In one study, sediment chemistry testing results for metals, PAHs, semivolatile organic compounds (SVOCs), PCB congeners, and chlorinated pesticides, were compared to sediment quality guidelines (SQGs) established by MacDonald et al. (1996) and the Canadian Council of Ministers of the Environment (2001). Several analytes tested exceeded the established threshold effects level (TEL); however, none of the concentrations exceeded the probable effects level (PEL). Additionally, general chemistry analytes, dioxin and furan congeners[1], and butyltins[2] were tested in the sediment samples (Anchor QEA 2012a).

In order to evaluate the limiting permissible concentration (LPC) compliance of the new work dredged material for placement at the Pascagoula ODMDS, site water and standard elutriate evaluations were performed for the target analytes to assess exceedances, as compared to the USEPA's water quality criteria (WQC) for saltwater for aquatic life. The WQC are two values, acute and chronic, which define two exceedance thresholds for the tested analytes. Whole sediment bioassay testing was performed for two organisms: 1) *Neanthes arenaceodentata* (polychaete); and 2) *Leptocheirus plumulosus* (estuarine

[1] There are no SQGs for general chemistry analytes and dioxin and furan congeners.
[2] None of the samples that were tested contained butyltins.

amphipod). None of the sediments tested exhibited a 10 day mean survival percentage that was statistically different from the reference sediments.

In addition to bioassay testing, bioaccumulation testing was performed for two organisms: 1) *Nereis virens* (sand worm) and; 2) *Macoma nasuta* (blunt-nose clam). Survival was assessed for each organism when exposed for 28 days to reference sediments, a laboratory control, and the sediments from each sample site. Neither organism displayed a 28 day mean survival percentage that was statistically different from the reference sediment. Mean tissue concentrations for each organism were compared to two sources:

- U.S. Food and Drug Administration (USFDA) action levels
- USEPA - Region 4 background tissue concentrations

Based on the testing results, tissue concentrations for three metals (arsenic, copper, and lead) and the dioxin toxicity equivalency quotient (TEQ)[3] were compared to the USFDA action levels and the USEPA background concentrations. None of the analytes tested surpassed the established USFDA action levels. Tissue sample concentrations of lead (clams) and dioxin TEQ (worms and clams) did exceed the USEPA background concentrations (PLS-03/04 and BCW-06). The lead tissue concentration of PLS-03/04 was also statistically different from the concentration found in tissue gathered from organisms exposed to the reference sediments. Concurrence by the USEPA regarding this exceedance is required prior to dredge material placement to determine whether the LPC is in compliance (EA 2011b).

With regard to the dioxin TEQ exceedances, the tissue concentrations of organisms exposed to the reference site sediments also exceeded the USEPA background concentration criteria. None of the dioxin TEQ values for the tissues gathered from organisms exposed to the sample sediments exceeded both the pre-test and reference site concentrations. Based on the assessment of the TEQ values and the individual tissue sample concentrations, it was assumed that the OCDD was not likely to produce a toxic effect (Anchor QEA 2012a).

[3] Specifically, octachlorodibenzo-p-dioxin (OCDD) was detected in samples BCW-05 (worms and clams), BCW-06 (clams), and PLS-01/02 (worms and clams), and 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD) was detected in PLS-01/02 (clams). Only four instances occurred where a test organism's tissue was significantly different than both the reference and pre-test tissue concentrations of OCDD, which is the least toxic of the dioxin congeners.

3.3 Biological Indicators

3.3.1 Habitat Access

There are no barriers to aquatic species access in the Action Area.

3.3.2 Prey Species

Open water areas in Mississippi Sound consist of a variety of unvegetated bottom habitats including clay/mud bottom, sand, and shell fragments with very little hard bottom substrate (Mississippi Museum of Natural Science [MMNS] 2005). Open-water habitats support communities of benthic organisms and corresponding fisheries populations. Phytoplankton (microscopic algae) are the major primary producers (plant life) in the open bay, taking up carbon through photosynthesis and nutrients for growth. Phytoplankton are consumed by zooplankton, fish, and benthic consumers. In Mississippi Sound, phytoplankton species' composition, abundance, and diversity change seasonally with occasional monotypic blooms; with the maximum abundance occurring in the winter and the minimum in the summer, which is dominated by diatoms (Holiday et al. 2007; Molina and Redalje 2010). Distributions are influenced by salinity, nutrient concentrations, temperature, and wind conditions. Phytoplankton densities are greatest where riverine waters override and spread out over Mississippi Sound waters, creating a nutrient-rich euphotic zone that is ideal for high rates of production (Ortner and Dagg 2011).

Zooplankton are important in Mississippi Sound, as the source of food for larval and juvenile fish, including the Federally listed Gulf sturgeon. They are most abundant during the spring, with the minimum densities occurring in the fall. Zooplankton are limited by turbidity (which limits the phytoplankton production and, therefore, food availability) and currents, which can carry them out to sea and away from concentrated food masses (Valiela 1995). The nutrient-rich riverine waters entering Mississippi Sound influence zooplankton productivity in the Sound and barrier island passes where high abundance has been reported (Holiday et al. 2007).

3.3.3 Vegetation

Currently, subtidal vegetation is sparse in Mississippi Sound and consists mostly of seagrasses. Existing seagrass populations off of the coast of Mississippi consist almost exclusively of shoal grass (*Halodule wrightii*). Historically, populations of shoal grass, star grass (*Halophila engelmannii*), wigeon grass (*Ruppia maritima*), manatee grass (*Syringodium filiforme*), and turtle grass (*Thalassia testudinum*) were present and abundant along the northern shores of the Mississippi barrier islands (Handley et al. 2007). Overall, Mississippi has lost half of the areal extent of seagrass since 1968 and it is now mostly composed of one seagrass species: shoal grass.

High turbidity and lack of suitable substrate have limited distribution of seagrass and other SAV in Mississippi Sound. Their occurrence is restricted to relatively quiet waters along the mainland and the northern shores of the barrier islands. Typically, the seagrass occurs in isolated patches usually less than several hundred acres in size. In turbid waters of the Sound and bays, seagrass beds are found only in shallow waters generally less than 6 feet deep, with most in 2 feet or less. Approximately 652 acres of submerged grass beds are located along the northern shores of all the barrier islands (NOAA 2011). A map of documented seagrass beds in the vicinity of the Action Area is provided (Figure 3). Based on these conditions and this information, no seagrass or other SAV is anticipated within the Action Area.

3.4 Pascagoula ODMDS Disposal Site

In 1991, the Pascagoula ODMDS was designated by the USEPA for both new work and maintenance materials generated by the Pascagoula Harbor Channel area executed by both public and private entities (USEPA/USACE 2006; EA Engineering, Science, and Technology 2011a). As a result, the ODMDS site is not expected to require further permitting. The ODMDS encompasses an area of approximately 18.5 square nautical miles and is bounded by Horn Island to the north, the Pascagoula Harbor Navigation Channel to the east, the navigation safety fairway to the south, and a north-south line running through Dog Keys Pass to the west (Figure 1). The Pascagoula ODMDS ranges from water depths of approximately 38 feet in the northern portion to more than 52 feet in the southern portion (USEPA and USACE 2006; Anchor QEA 2012). Placement of dredged materials at the ODMDS is restricted to depths below -20 feet MLLW.

As discussed in the Dredged Material Management Plan (DMMP) (Anchor QEA 2012a; Appendix B), there are significant offshore hydrodynamic conditions at the Pascagoula ODMDS site that would promote erosion and off-site dispersion of newly placed dredged materials. The dispersive extent of the site and associated capacity has not been quantified (USACE 2006); however, this site has been used by previous work and maintenance dredging events within the vicinity of the Port of Pascagoula resulting in no documented capacity concerns.

3.5 Littoral Zone Area Disposal Site

The LZA is an open-water dispersive site southeast of Horn Island and west of the existing Safety Fairway and the Horn Island Pass, which already has been permitted for dredged material disposal. As discussed in the DMMP (Anchor QEA 2012a; Appendix B), the northeastern portion of the LZA is the most shallow area of the site, while the southwestern region is the deepest. The site's capacity for new dredged material is unknown; however, this site has been used by previous work and maintenance dredging events within the vicinity of the Port, resulting in no documented capacity concerns. The proposed Project sand quantity is not expected to exceed the site's capacity (USACE 2011b). This site presents an opportunity for the beneficial use of the sand component of the dredged material as the natural east-to-west littoral drift will transport sandy sediments toward the barrier islands and other nearshore areas. Although site maintenance is not a requirement, pre- and post-placement surveys are necessary to determine on-site bathymetric conditions.

4 SPECIES INFORMATION AND PRESENCE IN THE ACTION AREA

This section provides species and critical habitat information and potential presence in the Action Area. The proposed Project is located within the marine environment of Mississippi Sound, which provides habitat for a variety of species of marine fish, marine mammals, and sea turtles, as identified in Table 1. Because all proposed Project activities will take place in-water within the Mississippi Sound, there is no suitable habitat for terrestrial species within the Action Area. As a result, terrestrial species listed by USFWS in Jackson County, as identified in Table 2, are not addressed in this BA.

4.1 Fish

4.1.1 Gulf Sturgeon Information and Presence

The Gulf sturgeon was listed throughout its range as a threatened subspecies on September 30, 1991. Gulf sturgeon, a subspecies of the Atlantic sturgeon (*A. oxyrinchus*), is an anadromous fish that uses freshwater habitats in coastal rivers during much of the year and returns to the Gulf of Mexico during late fall and winter. Historically, Gulf sturgeon occurred in rivers from the Mississippi River to the Suwannee River, and in bays and estuaries from Florida to Louisiana, including the Pascagoula River. Research is ongoing for current population levels outside the Suwannee, Apalachicola, and Pearl rivers, but they are believed to have declined from historical levels (USFWS and Gulf States Marine Fisheries Commission [GSMFC] 1995).

The present range for Gulf sturgeon is restricted to the Gulf of Mexico and its drainages, occurring primarily from Lake Pontchartrain (Louisiana) and the Pearl River system (Mississippi) east to the Suwannee River in Florida (USFWS and NMFS 2009). Adult fish spend 8 to 9 months each year in rivers and 3 to 4 of the coolest months in the Gulf of Mexico, including its bays and estuaries (USFWS and NMFS 2009). Gulf sturgeon from the Pascagoula River tend to move into coastal waters beginning in October and typically leave the marine environment in February and March (Heise et al. 2005; Ross et al. 2009). The Bouie River, a tributary to the Pascagoula River, contains the only documented Gulf sturgeon spawning site west of the Mobile River Basin (Heise et al. 2005). Seagrass beds with mud and sand substrates appear to be important marine habitats (Mason and Clugston 1993). Gulf sturgeon from both the Pearl and Pascagoula rivers are known to use coastal Mississippi including the barrier islands for migration and foraging. Rogillio et al. (2007) and Ross et al. (2009) located tagged adult Gulf sturgeon between Cat, Ship, Horn, and Petit Bois islands from October through March. There is still a lack of information on sub-adult and juvenile sturgeon habitat use in Mississippi Sound, but it is believed that the inshore areas of the Sound may be important nursery areas (Ross et al. 2009).

The recent USFWS and NMFS Gulf sturgeon 5-year review identified both the Pearl River and Pascagoula River populations of Gulf sturgeon as being of unknown number and viability, due to likely impacts from Hurricane Katrina in 2005 and the lack of subsequent survey. Research is ongoing in the area to determine the status of the adult and sub-adult population. Known threats to Gulf sturgeon in marine waters include channel improvements and maintenance activities, water quality degradation, contaminants, red tide, and climate change (USFWS and NMFS 2009).

4.1.2 Gulf Sturgeon Critical Habitat Information and Presence

On March 19, 2003, USFWS and NOAA designated 14 geographic areas among Gulf of Mexico rivers and tributaries as critical habitat for Gulf sturgeon, based on seven primary constituent elements (PCEs) essential for its conservation, as defined in the 2003 Federal Register. These seven elements are outlined below (FR Vol. 68, No. 53):

1. Abundant food items, such as detritus, aquatic insects, worms, and/or mollusks, within riverine habitats for larval and juvenile life stages; and abundant prey items, such as amphipods, lancelets, polychaetes, gastropods, ghost shrimp, isopods, mollusks and/or crustaceans, within estuarine and marine habitats and substrates for sub-adult and adult life stages.
2. Riverine spawning sites with substrates suitable for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone, or hard clay.
3. Riverine aggregation areas, also referred to as resting, holding, and staging areas, used by adult, sub-adult, and/or juveniles, generally, but not always, located in holes below normal riverbed depths, are believed necessary for minimizing energy expenditures during freshwater residency and possibly for osmoregulatory functions.

4. A flow regime (i.e., the magnitude, frequency, duration, seasonality, and rate-of-change of freshwater discharge over time) necessary for normal behavior, growth, and survival of all life stages in the riverine environment, including migration, breeding site selection, courtship, egg fertilization, resting, and staging, and for maintaining spawning sites in suitable condition for egg attachment, egg sheltering, resting, and larval staging.
5. Water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics necessary for normal behavior, growth, and viability of all life stages.
6. Sediment quality, including texture and chemical characteristics, necessary for normal behavior, growth, and viability of all life stages.
7. Safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (e.g., an unobstructed river or a dammed river that still slows for passage).

The 14 geographic areas of critical habitat encompass approximately 1,739 river miles and 2,333 square miles of estuarine and marine habitat. In Mississippi, critical habitat for Gulf sturgeon includes 244 miles of the Pearl River, including Bogue Chitto; 126 miles of the Pascagoula River, including the Leaf, Bouie, Chickasawhay, and Big Black Creek tributaries; as well as, Mississippi Sound (FR Vol. 68, No. 53). This critical habitat provides juvenile, sub-adult, and adult feeding, resting, and migration habitat for Gulf sturgeon from the Pearl and Pascagoula rivers (68 FR 13395).

The critical habitat determinations focus on the PCEs that are essential to the conservation of the species. Critical habitat for the Gulf sturgeon within the proposed Project vicinity is identified as Unit 8. Unit 8 is proposed to protect and conserve the PCEs of winter-feeding habitat, water quality, sediment quality, and migration habitat.

Limited data are available on Gulf sturgeon feeding habits because their listed status limits sampling efforts. Generally, adults and sub-adults could be described as opportunistic benthivores typically feeding on benthic marine invertebrates including amphipods, lancelets, polychaetes, gastropods, shrimp, isopods, mollusks, and crustaceans. The benthic community noted by Barry A. Vittor and Associates (1982) within Mississippi Sound provides suitable forage habitat for adult and sub-adult fish. It is highly likely that the benthic assemblages within the Action Area would provide suitable forage for Gulf sturgeon.

Gulf sturgeon feed principally on benthic invertebrates; therefore, potential impacts to the winter-feeding PCE would be confined to possible impacts to the benthic community. Barry A. Vittor and Associates (1982) classified the benthic community in a study of Mississippi Sound. Generally, benthic invertebrate densities increase from fall through the spring months because most of the dominant species exhibit a late-winter to early-spring peak in production. Species diversity, evenness, and richness (number of taxa), demonstrate minor temporal fluctuations. Biomass per unit area also increases from fall to spring, primarily as a result of higher densities.

Changes in benthic community structure, composition, and function may occur in the widened channel due to conversion of 87.6 acres from shallow water habitat to deeper water habitat; however, these effects are likely temporary (Bolam and Rees 2003). Benthic community recovery has occurred within 10 months from perturbation in shallower, higher energy estuarine habitats, while recovery can take as long as 8 years in deeper, more stable habitats (Bolam et al. 2010; Bolam and Rees 2003; Newell et al. 1998; Sheridan 1999; Sheridan 2004;Wilber et al. 2006; VanDerWal et al. 2011). Within the bottom waters of the new deeper depths of the widened channel area, the benthic community may be altered from the current composition to adjust to the new depth and lower oxygen conditions.

The water quality PCE is important in Gulf sturgeon critical habitat. Temperature, salinity, pH, hardness, turbidity, oxygen concentration, and other chemical characteristics must be of suitable quality for normal behavior, growth, and viability of each Gulf sturgeon life stage. If water quality is severely degraded, adverse impacts to Gulf sturgeon and its critical habitat may result.

The sediment quality PCE, including texture and other chemical characteristics, is listed to ensure sediment suitable for normal behavior, growth, and viability of each life stage. In addition, sediment quality suitable to support a viable benthic community is necessary to support Gulf sturgeon feeding.

The migration habitat PCE is concerned with ensuring safe unobstructed passage for the species. It is intended primarily for the more confined areas near the river mouths or the rivers themselves. The species is known to migrate through the Action Area (NMFS 2009).

The Gulf sturgeon designated critical habitat map for the Action Area and surrounding vicinity is shown on Figure 4. Portions of the Action Area within Gulf sturgeon designated critical habitat include the areas to receive channel widening and the LZA dredge disposal area. The ODMDS dredge disposal area is located outside the designated critical habitat area.

4.2 Marine Mammals

4.2.1 Blue Whale Information and Presence

The blue whale was listed as an endangered species in 1970. Blue whales are the largest animals known to have inhabited the earth, reaching over 100 feet in length and weighing nearly 200 tons. The subspecies in the Northern Hemisphere is smaller than that in the Southern Hemisphere. They were heavily exploited by the whaling industry, and populations in all world oceans have been reduced to mere fractions of their historical numbers (NMFS 2012b).

Blue whales are long and slender with a proportionally small dorsal fin. They are a mottled gray color. The primary diet of blue whales is krill (euphasiids). The life history details of the blue whale have yet to be discerned, but it is believed that the gestation period is 10 to 12 months and that calves nurse for 6 to 7 months. The age of sexual maturity is believed to be 5 to 15 years. Blue whales are a sexually dimorphic species with the females reaching greater sizes than the males (NMFS 2012b).

The blue whale is a cosmopolitan species of baleen whale. They inhabit sub-polar to sub-tropical latitudes, following a seasonal migration pattern between summering and wintering areas driven by food requirements. Some evidence suggests that certain individuals remain in an area year-round. The species is often found in coastal waters, but is more likely to occur offshore than other whale species (NMFS 2012b).

In the North Atlantic, blue whales are most frequently spotted off the coast of eastern Canada. They are rarely seen in the shelf waters of the eastern United States, but occasional sightings have been made off Cape Cod, Massachusetts, which is believed to represent the current southern limit of their feeding range. There is some evidence to suggest that blue whales occasionally stray into the Gulf of Mexico and the Caribbean (NMFS 2012b), but information about the blue whale's presence is lacking for areas specifically offshore of Mississippi.

Blue whales were listed as endangered throughout their range under the ESA and as depleted throughout their range under the Marine Mammal Protection Act of 1972 (MMPA). The primary threats facing blue whales are vessel strikes, fisheries interactions, and habitat degradation (NMFS 2012b).

4.2.2 Finback Whale Information and Presence

The finback whale was listed as an endangered species in 1970. After the blue whale, the finback whale (also known as the fin whale) is the second largest whale species, reaching a length of approximately 75 feet in the Northern Hemisphere and weighing 40 to 80 tons. Sexually dimorphic, female finback whales measure longer than males. These baleen whales are fast swimmers and the killer whale (*Orcinus orca*) is their only non-human predator (NMFS 2012c).

Finback whales have a streamlined body and a V-shaped head with a tall falcate dorsal fin. They have a distinctive coloration pattern: the back and sides of the body are black or dark brown and the ventral surface is white. The asymmetrical head coloration is dark on the left side of the lower jaw and white on the right side. Finback whales fast during winter migration, but during the summer they feed on krill, small schooling fish, and squid. Sexual maturity is reached between 6 and 12 years of age. After a 1-year gestation period, females give birth to a single calf in tropical or subtropical waters in mid-winter (NMFS 2012c). Finback whales are commonly found in the deep, offshore waters of all major oceans, primarily in temperate to polar latitudes. Their seasonal migration pattern is complex and specific routes have not been identified. A southward trend occurs in the fall from eastern Canada down the eastern coast of the United States and into the West Indies. The species range is very global—finback whales in the United States are concentrated in Hawaii, Alaska, the Pacific Northwest, and the Western North Atlantic. The Western North Atlantic stock includes those individuals in the Gulf of Mexico. Finback whale presence or abundance in the waters off the coast of Mississippi has not been documented (NMFS 2012c).

The most recent 5-year review of finback whales indicates that the North Atlantic population has decreased from 5,000 individuals in 1980 to 3,269 currently (NMFS 2011). Finback whales were listed as endangered throughout their range under the ESA and as depleted throughout their range under the MMPA. In the United States, threats to finback whales include vessel collisions, entanglement in fishing gear, habitat degradation, and noise disturbance (NMFS 2011).

4.2.3 Humpback Whale Information and Presence

The humpback whale was listed as an endangered species in 1970. Humpback whales are best known for the complex songs sung by males on wintering grounds, which have yet to be explained. They have long pectoral fins that give them increased maneuverability. Like all baleen whales, females are larger than males, reaching 59 feet. Body coloration is dark gray, but individuals have characteristic white patterns on their pectoral fins and belly that can be used for identification. Humpbacks are frequently seen breaching or slapping the water surface with their fins, tails, or heads. They feed on krill, plankton, and small fish during the summer to build up enough blubber to sustain them during the winter. They exhibit complex social hunting techniques, such as "bubble netting." While feeding and calving, humpbacks prefer to remain in shallow waters. Feeding grounds are in cold coastal waters; calving grounds are typically near offshore reef systems, islands, or continental shelves (NMFS 2012d).

Humpbacks live in all major oceans between the equator and sub-polar latitudes. Humpbacks seasonally migrate in the Atlantic from the Gulf of Maine in the summer to the Dominican Republic in the winter. They migrate the farthest distance of any mammal. During migration, humpbacks stay near the surface of the ocean (NMFS 2012d). According to NMFS (2012d), the species is known to occur offshore of Mississippi, but estimates of abundance are not available.

Humpback whales have been considered endangered since 1970 under the Endangered Species Conservation Act (ESCA) and remain endangered under the ESA. They also are considered depleted under the MMPA. The best estimate for the North Atlantic population of humpback whales is 11,570 individuals. Threats facing this species include entanglement in fishing gear, ship strikes, whale watch harassment, habitat impacts, and proposed harvest (NMFS 2012d).

4.2.4 Sei Whale Information and Presence

The sei whale was listed as an endangered species in 1970. Sei whales are members of the baleen whale family and can reach lengths of 40 to 60 feet and weigh 100,000 pounds, with females being slightly larger than males. They have long bodies that are bluish-gray to black and pale underneath. This species has an erect falcate dorsal fin located far down the back. They also have 30 to 65 short ventral pleats extending from the mouth to the naval (NMFS 2012e).

Sei whales are usually observed singly or in small groups. They dive to feed on plankton, small schooling fish, and cephalopods, and prefer to feed at dawn. Sexual maturity is reached between 6 and 12 years and gestation periods range from 11 to 13 months. Sei whales have a cosmopolitan distribution, preferring subtropical to subpolar waters on the continental shelf edge and slope. Distribution and movement patterns are not well understood and specific information on sei whale presence in the waters off of the Mississippi coast is lacking (NMFS 2012e).

Sei whales are listed as endangered under the MMPA and the ESA. Like other whales, sei whales are susceptible to ship strikes and becoming bycatch (NMFS 2012e).

4.2.5 Sperm Whale Information and Presence

The sperm whales are the largest odontocetes or toothed whales and the most sexually dimorphic cetaceans with males larger than females. They also have the largest brain of any animal. The sperm whale is distinguished by its extremely large head, which takes up 35 percent of its total body length with an asymmetrically situated blowhole on the left side. These whales are dark gray, but the inside of the mouth is often bright white. Because they spend most of their time in deep waters, their diet consists of large squid, sharks, skates, and fishes. Dives may last more than an hour. Females sexually mature by 9 years old and males by their late 20s (NMFS 2012f).

Sperm whales are nearly continuously distributed in the deep waters of all world oceans. They are uncommon in waters less than 984 feet deep (NMFS 2012f). These whales are present in the Gulf of Mexico year-round, which suggests that there may be “resident” populations, but sightings are more common during the summer (NMFS 2009). Whitehead (2002) estimates the worldwide count of sperm whales to be 300,000 to 450,000 individuals. The southern U.S. Atlantic stock was surveyed at 2,197 individuals with the northern Gulf of Mexico stock estimated to consist of approximately 1,315 individuals (NMFS 2009). These estimates include individuals that occupy the waters off the Mississippi coast.

The sperm whale has been listed as endangered throughout its range since the Endangered Species Conservation Act of 1969 and also is protected under the MMPA. The greatest threats to sperm whales are attacks by killer whales and impacts by shipping and fishing operations (NMFS 2012f; NMFS 2009).

4.2.6 West Indian Manatee Information and Presence

The West Indian or Florida manatee was listed as an endangered species in 1967 (under a law that preceded the ESA) throughout its range (USFWS 2001a). The manatee is also protected at the Federal level under the MMPA.

The manatee (sometimes called sea cow) is found primarily along the coast of Florida; however, there have been sightings in coastal waters of Alabama and Mississippi (Mississippi-Alabama Sea Grant Consortium 2008). Most adult manatees are approximately 10 feet long and weigh 800 to 1,200 pounds. These “gentle giants” have a tough, wrinkled, brown-to-gray skin that is continuously sloughed off. Hair is distributed sparsely over the body, with stiff whiskers around the mouth. Manatees will consume any aquatic vegetation available and will even occasionally feed on fish. They spend approximately 5 hours feeding daily, consuming amounts up to 4 to 9 percent of their body weight (USFWS 2012b).

Manatees spend their lives moving between freshwater, brackish, and saltwater environments. They prefer large, slow-moving rivers, river mouths, and shallow coastal areas, such as coves and bays. Great distances may be covered as they migrate between winter and summer grounds. During the winter, the United States manatee population remains in the coastal waters of southern Florida to springs and warmwater outfalls as far north as southeast Georgia. During summer months, manatees may migrate as far north as Virginia on the east coast and Louisiana on the Gulf of Mexico (USFWS 2001a).

Outside of Florida, manatees are mainly migratory species during the warmer months and sightings in Mississippi have increased (O'Shea and Ludlow 1992; Mississippi-Alabama Sea Grant Consortium 2008). Manatees are known to migrate through the Action Area, and in May 2011, two fishermen reported hooking a manatee around the Katrina reef near Deer Island, just off the Mississippi coast (Raines 2011). According to USFWS (2012c), the manatee may potentially occur in coastal waters off of Jackson County, Mississippi. MMNS (2011) has documented manatee in coastal waters off of Harrison County.

Manatees are adversely impacted by collisions with boats, crushing and drowning in canal locks, harassment by skin divers and boaters, entanglement in fishing line, toxins ingested during red tide events, and destruction of seagrass beds. Manatee population trends are not well known, but deaths are thought to have increased steadily (6.1 percent a year, exponential regression, 1976 to 1991; USFWS 2001a). The manatee has difficulty rebounding from these threats because of its late breeding maturity and its low reproductive rate (USFWS 2012b).

4.3 Sea Turtles

4.3.1 Green Sea Turtle Information and Presence

The green sea turtle was listed as an endangered species in 1978. The green sea turtle is the largest of the hard-shelled sea turtles weighing up to 350 pounds. The carapace is multicolored and smooth. Unique among other sea turtles, adult green turtles are herbivorous, feeding mainly on seagrasses and algae (NMFS 2012g). While offshore, however, they may opportunistically feed on pelagic prey (NMFS and USFWS 2007a).

Hatchlings swim offshore after emerging from the nest where they feed on a variety of pelagic plants and animals near the surface.

The green sea turtle is highly mobile and complex migrations through differing habitats are an important part of its life history. Tagging studies have shown that females are philopatric to nesting grounds, returning to the same beach each nesting season. It also has been suggested that turtles may return to the same foraging areas following nesting seasons (NMFS and USFWS 2007a).

The green turtle is globally distributed and generally found in tropical and subtropical waters along continental coasts and islands, and inside reefs, bays, and inlets. Green sea turtles are attracted to lagoons and shoals with abundant marine grass and algae. In U.S. waters, green turtles are found in inshore and nearshore waters from Texas to Massachusetts, but they primarily nest along the southeast coast of Florida. Green sea turtles have been observed in Mississippi Sound. This species of turtle is not known to nest on the Mississippi coast or barrier islands, but might be attracted to the seagrass beds as a food source in nearshore waters (Gunter 1981). In the southeastern United States, females generally nest in the summer between June and September. Exploitation of green sea turtle nesting grounds either by human interference or pollution poses the greatest threat to these turtles. Other threats include commercial harvest and incidental catch during trawling (NMFS and USFWS 2007a).

4.3.2 Hawksbill Sea Turtle Information and Presence

The hawksbill sea turtle was listed as an endangered species in 1970. The hawksbill sea turtle's name is derived from the beak-like mouth that allows it to reach into holes of coral reefs to feed on sponges, their primary food source. Hawksbill sea turtles are unique among sea turtle species because they have two pairs of prefrontal scales on their heads and two claws on each flipper. The carapace is dark to golden brown streaked with orange, red, or black with a serrated back and overlapping scutes (NMFS 2012h).

Females return to their natal beaches every 2 to 3 years to nest at night. They generally lay three to five 130-egg nests per season. They preferentially nest in the dune vegetation of pocket beaches with little or no sand. Hawksbills are commonly associated with healthy coral reefs, but post-hatchlings are thought to occupy the pelagic environment taking shelter in floating algal mats (NMFS 2012h).

Hawksbill sea turtles are widely distributed throughout the Caribbean Sea and the western Atlantic Ocean in Southern Florida and the Gulf of Mexico (NMFS and USFWS 2007b). In the continental United States, these turtles are most closely associated with Florida and Texas, but they have been documented in all Gulf states, and as far north as Massachusetts. Nesting is restricted to the southeast coast of Florida where they are still rare (NMFS 2012h). The greatest threats to the species include habitat loss of coral reefs, commercial harvesting, increased recreational use of nesting beaches, and incidental capture in fishing gear (NMFS 2012h). Hawksbill sea turtles are likely to pass through the Action Area, but would not be a resident of Mississippi Sound, due to rare encounters in northern latitudes.

4.3.3 Kemp's Ridley Sea Turtle Information and Presence

The Kemp's ridley sea turtles are the smallest sea turtle. Their circular carapace is grayish-green with five pairs of costal scutes. Females display a unique synchronized nesting habit known as "arribada" or mass nesting, which has been speculated to be advantageous for offspring survival. Adults typically occupy neritic areas containing muddy or sandy bottoms where they can feed on crabs, fish, jellyfish, and mollusks (NMFS 2012i).

Kemp's ridley sea turtle was listed as endangered throughout its range (i.e., Gulf of Mexico and Atlantic Ocean) on December 2, 1970. Since late 2010, the Institute for Marine Mammal Studies (IMMS) has rescued and subsequently released numerous Kemp's ridley sea turtles (most were juveniles), all fitted with satellite tracking devices to track movement and migration patterns within the Gulf of Mexico (IMMS 2012). Releases in Mississippi Sound (south of Ship Island) included six in November 2010, four in April (another six were released off the coast of Cedar Key, Florida), and five in October 2011. Evaluation of the tagging information and re-capture data indicated that the majority of these sea turtles move into the Gulf of Mexico to the west and outside the Action Area. Most Kemp's ridley sea turtles, however, nest on the coastal beaches of Mexico and a small number nest at Padre Island National Seashore, Texas, from April to July (NMFS 2003). Approximately 100 nests were laid in Texas in 2001 (NMFS and USFWS 2007c). Outside of nesting, the major habitat for Kemp's ridley sea turtle is the nearshore and inshore waters of the northern Gulf of Mexico, often in salt marsh habitats (USFWS 2001b). In 2010, NOAA and USFWS were petitioned to designate critical habitat for the species for nesting beaches along the Texas coast and marine habitats in the Gulf of Mexico and the Atlantic Ocean. The petition is still under consideration.

The Kemp's ridley sea turtle population has declined since 1947 (when an estimated 42,000 females nested in 1 day) to a nesting population of approximately 1,000 in the mid-1980s (NMFS and USFWS 2007c). The decline of this species was primarily due to human activities including collection of eggs, fishing for juveniles and adults, and killing adults for meat and other products. This species is likely to pass through the Action Area, but would not be a resident of Mississippi Sound.

4.3.4 Leatherback Sea Turtle Information and Presence

The leatherback sea turtle was listed as an endangered species in 1970. The leatherback sea turtle is both the largest turtle and the largest living reptile in the world. Mature males and females can be as long as 6.5 feet and weigh almost 2,000 pounds. The leatherback is the only sea turtle that lacks a hard, bony shell; the carapace consists of leathery, oil-saturated connective tissue overlaying loosely interlocking dermal bones (NMFS 2012j). The carapace has seven longitudinal ridges and tapers to a blunt point. Adult leatherbacks are primarily black with a pinkish white mottled ventral surface and pale white and pink spotting on the top of the head. The front flippers lack claws and scales and are proportionally longer than in other sea turtles. The ridged carapace and large flippers are characteristics that make the leatherback uniquely equipped for long distance foraging migrations (NMFS 2012j). Leatherbacks have pointed tooth-like cusps and sharp-edged jaws that are perfectly adapted for a diet of soft-bodied pelagic prey, such as jellyfish. A leatherback's mouth and throat also have backward-pointing spines that help retain such gelatinous prey. Female leatherbacks lay clutches of approximately 100 eggs on sandy, tropical beaches several times during a nesting season (NMFS 2012j).

Leatherbacks are commonly known as pelagic animals, but also forage in coastal waters. Leatherbacks are the most migratory and wide ranging of sea turtle species. Leatherbacks mate in the waters adjacent to nesting beaches and along migratory corridors. After nesting, female leatherbacks migrate from tropical waters to more temperate latitudes, where they feed on the abundant jellyfish present in the summer (NMFS and USFWS 2007d). Leatherback presence in the waters of coastal Mississippi has been documented by USFWS (2012d), but they are not believed to nest there and specific data are unavailable. Canada supports one of the largest seasonal foraging populations of leatherbacks in the Atlantic. The U.S. Caribbean, primarily Puerto Rico and the U.S. Virgin Islands, and southeast Florida support minor nesting colonies, but represent the most significant nesting activity within the United States (NMFS and USFWS 2007d).

In Florida, an increase of 98 nests in 1988 to 800 to 900 nests in the early 2000s was documented (NMFS and USFWS 2007d). Leatherback turtles face threats on both nesting beaches and in the marine environment. The greatest causes of decline and the continuing primary threats to leatherbacks worldwide are long-term harvest and incidental capture in fishing gear. This species is likely to migrate through the Action Area, but does not nest in the state of Mississippi.

4.3.5 Loggerhead Sea Turtle Information and Presence

The loggerhead sea turtles get their name from their large heads, which support powerful jaws to feed on hard-shelled prey, such as whelks and conch. The carapace is heart-shaped and reddish-brown, while the plastron is pale yellow (NMFS 2012k).

The loggerhead turtle was listed as threatened throughout its range on July 28, 1978 (43 FR 82800). Loggerhead turtles are widely distributed throughout their range and may be found hundreds of miles out to sea, as well as, in inshore areas, such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers (NMFS 2012k). Loggerheads are known to migrate over long distances, with tagged specimens having been recaptured 1,200 to 1,500 miles from the point of release.

Loggerheads are capable of living in a variety of environments. They occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian oceans. The major nesting beaches are located in the southeastern United States, primarily along the Atlantic coast of Florida, North Carolina, South Carolina, and Georgia. Loggerheads are known to nest annually in small numbers on the Gulf Islands National Seashore (includes Horn Island and Petit Bois Island) in Mississippi (NMFS and USFWS 2007e).

In 2000, it was estimated that 53,000 to 92,000 nests are laid annually in the southeastern United States and the Gulf of Mexico and the total number of nesting females was estimated to be 32,000 to 56,000 (NMFS and USFWS 2007e). Most recent evidence suggests that the number of nesting females from southern Virginia to Florida may be declining (NMFS and USFWS 2008). Until the 1970s, loggerhead turtles were commercially harvested for their meat, eggs, leather, and fat. Because of their feeding behavior and their habit of wintering in shallow waters, loggerheads are more likely to be caught in large shrimp trawl nets and drown.

5 DIRECT AND INDIRECT EFFECTS OF THE PROPOSED PROJECT

Proposed Project elements include dredging for channel widening, disposal of dredged material, and relocation of aids to navigation. Proposed Project effects associated with these elements that could impact listed species and critical habitats include noise, water quality, direct habitat effects, and entrainment. Conservation measures will be employed to minimize these effects. Noise and water quality impacts will be short-term due to the existing wind, current, and tidal fluctuations in the Action Area. No permanent habitat impacts are expected because the proposed Project is located adjacent to an existing navigation channel and recolonization of disturbed areas with benthic species is expected to occur in the marine environment of Mississippi Sound (Bolam and Rees 2003; see Section 5.3). Disposal of dredge material will occur in permitted areas that contribute to sediment drift in the area of the barrier islands. No impacts to seagrass or other SAV are anticipated due to lack of presence of these species in the Action Area. Potential entrainment of listed species during dredging activity is the most significant potential impact associated with the proposed Project.

Dredging and disposal methods in the proposed Action Area are consistent with recent and current maintenance and new work dredging methods used by the USACE in Pascagoula, Mobile, and Gulfport harbors. These methods have been addressed in a number of previous environmental documents, including BAs and BOs regarding endangered and threatened species. Specific effects from the Proposed Project are discussed in the following sections.

5.1 Noise

Underwater sound pressure levels expected from pile driving can be estimated for the proposed Project by using similar prior work. In a recent pile driving project, noise levels were measured for driving wood piles using a 3,000-pound drop hammer in Alameda California (ICF Jones & Stokes and Illingworth and Rodkin, Inc. 2009). At 33 feet, peak sound pressures were generally in the range of 170 to 180 (decibel) dB, and root mean square (RMS) sound pressure levels ranged from 160 to 168 dB. During some short periods, sound pressures exceeded 180 dB peak and 170 dB RMS at 33 feet. The highest measured levels were 191 dB peak and 176 dB RMS. Sound pressures were typically 10 dB lower at 66 feet from the pile. Measurements taken at 33 feet in two different directions were quite similar.

It took approximately 30 minutes to drive the piles, but pile strikes were infrequent (approximately once or twice per minute) because a drop hammer was used. These sound pressures are considered to be higher than those anticipated at the proposed Project center line range marker relocation sites, because there are no nearby reflective surfaces present in Mississippi Sound and the substrate is composed of soft to very soft clays, which absorb the energy instead of reflecting it into the water column. In addition, the barrier island chain provides a physical barrier to sound propagation that could otherwise impact other listed marine mammal species in the Gulf of Mexico.

Based on this information, underwater noise created by the relocation of the wood pile supported markers and ranges will be below the interim fish injury thresholds currently accepted by the NMFS, 208 dB peak level sound measurement (LPEAK), and 187 dB cumulative sound exposure level (SEL; Federal Highway Administration [FHWA] 2012). Noise will also be below the interim guidance for Level A (180 dB RMS and Level B (160 RMS) for marine mammals, within 66 feet or less (NOAA 2012). Since the West Indian manatee is the only endangered mammal known to infrequently visit the Action Area, the probability of noise impacts to this species for the short duration pile driving efforts is less than one percent for each of the four 100 minute duration range markers and each of the twenty-three 10 minute duration markers over the 18 month construction cycle.

5.2 Entrainment in Dredging Equipment

Management protocols and take guidelines established for dredging under the GRBO for hopper dredging conducted within the Gulf of Mexico do not apply to the proposed Project because: 1) The GRBO does not include improvement of channels to depths or widths not previously Federally authorized throughout the area; 2) dredging occurs in areas within the designated Gulf sturgeon critical habitat; or 3) disposal occurs in areas within designated Gulf sturgeon critical habitat (USFWS and NMFS 2003, 2009). Before construction, the widening will have been authorized by the parallel USACE Section 204(f) process.

Construction and maintenance of FNCs have been identified as potentially significant sources of sea turtle mortality (NMFS 2007). Hydraulic, clamshell, and hopper dredges all pose varying levels of risk for sea turtles and Gulf sturgeon. Aquatic organisms (including listed species) present within the immediate dredging vicinity could potentially be injured or killed if picked up by the dredge equipment or if struck by dredge vessels. The entrainment potential for aquatic organisms is based on many factors related to both the dredging operation and behavior of the organism itself, the abundance of organisms in the area, swimming ability of the organism, behavioral responses of the organism to dredging activity, total area dredged, duration of dredging, and speed of dredging. Larval, juvenile, and adult life stages that may be present in the vicinity of the dredge head may not be able to escape the entrainment field. In general, larger organisms are less likely to become entrained, perhaps due to their stronger swimming ability compared to smaller organisms (Kimley et al. 2009).

Hydraulic or mechanical dredging is not known to take sea turtles; sea turtles are highly mobile and would likely avoid the area during the short-term localized proposed Project activity and noise.

A hopper dredge may be used during the dredging activity. Hopper dredges are known to adversely impact Federally listed species (i.e., sea turtles and Gulf sturgeon) by entrainment in the suction dragheads. To reduce the possibility of protected species interactions, industry and agency conservation measures will be implemented, as described in Section 2.6. Work also will be conducted within the approved in-water work windows (Section 2.5) which will have the effect of making it less likely that listed species will be present during this time. However, even with the implementation of industry conservation measures and work windows, take of individuals of listed species may occur using the hopper dredging method.

5.3 Turbidity and Resuspended Sediments

Dredging activities can affect water quality by increasing turbidity caused by resuspension of sediments. Turbidity is an optical property of water that occurs when suspended organic and inorganic particles in the water column scatter light and reduce the light available to underwater environments. Sediments can be resuspended during dredging and disposal activities, which increase turbidity throughout the water column at varying levels, which are measured in mass as TSS. In general, levels of TSS are expected to be highest closest to the dredging and placement operations. For dredging, larger plumes and elevated turbidity levels would be expected near the area where the dredging equipment impacts the channel bottom. The amount and extent of resuspension is a byproduct of several factors, including physical properties of the sediment, site conditions, nature and extent of debris and obstructions, and operational considerations of the dredge equipment and operator. Sediment plume sizes typically decrease exponentially with movement away from the dredging and placement sites both vertically and horizontally, as well as, with time due to movement of suspended material with tides and currents (Bridges et al. 2008).

Resuspended sediment and turbidity can affect fish via several mechanisms, including direct mortality, gill tissue damage, physiological stress, and behavioral changes. The level of impact to individuals depends on the amount of time an individual is exposed to suspended sediments, the concentration of suspended sediment in the water column, the composition of the sediments (e.g., fine-grained versus coarse-grained, chemical associations). Impacts could result in lethal or sub-lethal physical or behavioral responses from aquatic organisms.

Turbidity and resuspended sediment impacts will be short-term due to existing wind, current, and tidal fluctuations in the Action Area. The existing condition of Mississippi Sound water is a characteristic brownish color, due to high turbidity and tannin levels (MDEQ 2006). It is anticipated that any turbid or resuspended sediments will dissipate to background levels within 750 feet of the dredging activity and within the confines of the navigation channel, in compliance with MDEQ water quality standards (MDEQ 2007). At the placement areas, the LZA is, by design, a very active and high energy zone. The sediments placed there are predominantly material with a sand content of at least 70 percent sand (Atkins North America 2012). Material of this density, when placed by dredging, is anticipated to fall out of suspension well within the 750 foot MDEQ mixing zone. Following settlement of this material post-dredging, overall coastal littoral drift will be expected to move these sediments west over time.

5.4 Dissolved Oxygen, Salinity, and Water Temperature

Suspension of anoxic sediments during dredging can result in reduced DO in the water column as the sediments oxidize. Sub-lethal effects of DO concentrations below saturation can include metabolic, feeding, growth, behavioral, and productivity effects. Behavior responses can include avoidance and migration disruption (NMFS 2005).

In general, DO, salinity, and temperature values in Mississippi Sound vary with different depths in the water column. Temperature and DO values typically decrease with deeper depths. Salinity is typically higher in deeper depths, although salinity levels fluctuate significantly within 5 feet of the surface. Storm surges can transport large quantities of higher salinity Gulf waters into the Sound while heavy rains, which may or may not accompany a storm, can flush salinity from the Sound (Atkins North America 2012). The deeper navigation channel allows the development of a density current that contributes to transport of Gulf salinity into the system (Orlando et al. 1993).

Temporary and minor reductions in DO may occur during dredging. Mixing of water with bottom sediments may result in increased chemical and biological oxygen demand, reducing localized DO. In addition, widening the existing navigation channel by 100 feet will marginally increase the volume of the existing density current and increase the area of deeper depths within Mississippi Sound. This could lead to localized changes to DO in the new deeper depths because areas deeper than approximately 14 feet often have DO concentrations below the 4.0 mg/L MDEQ water quality standards, and areas deeper than 19.2 feet are typically expected to be hypoxic (DO concentrations less than 2.0 mg/L) (Atkins North America 2012). However, these changes are not expected to result in significant overall effects to listed species or their prey due to the fact that the areas will recolonize with similar benthic species after completion of the proposed Project and because the impacted area is less than one percent of the total available foraging habitat in Mississippi Sound.

Listed species in the Action Area occupy both shallow and deep water habitats of the Gulf and are accustomed to high fluctuations of DO, salinity, and temperature in the Sound from existing natural processes. Thus, significant effects to listed species from temporary changes in localized conditions during dredging are not anticipated. Further, the permanent changes in the benthic areas of deeper depths are not anticipated to be significant.

5.5 Disturbance of Benthic Prey Species

Dredging activities and disposal of dredged material will occur within areas containing benthic species. Dredging and disposal will cause the complete removal or burial of benthic species within the dredging and disposal footprints, respectively. This could lead to a temporary loss of foraging opportunities in the vicinity of the dredging action for aquatic species that rely upon benthic resources as a prey base. However, these impacts are identified as temporary in some dredging and disposal areas (Bolam and Rees 2003). Existing studies in Mississippi Sound show that following dredging and nourishment activities, changes in community structure and composition can occur, although these impacts are expected to be temporary (Bolam and Rees 2003). However, even longer-term colonization timing would not be expected to cause significant effects to predator species because the impacted area is less than one percent of the total available foraging habitat in Mississippi Sound.

Overall, the proposed Project will temporarily affect foraging habitat for Gulf sturgeon, but will not result in permanent significant effects. In addition, the proposed Project is not expected to negatively affect sea turtle foraging habitat. Leatherbacks are pelagic feeders and the modification of the benthos through the dredging and disposal activities would not affect pelagic resources. Green sea turtles are specialist feeders that target sponges and seagrass or macroalgae. The proposed Project would not adversely affect these resources. Kemp's ridley and loggerhead sea turtles are generalist carnivores, typically preying on benthic mollusks and crustaceans in the nearshore environment. Any habitat and food availability effects of the proposed Project on Gulf sturgeon and sea turtles would be insignificant, due to the relative proposed Project areal extent versus available foraging habitat in Mississippi Sound.

5.6 Relocation of Aids to Navigation

Short-term impacts related to relocation of aids to navigation include temporary minor turbidity/elevated TSS due to sediments disturbed as a result of pile pulling and relocating, and temporary noise impacts due to wooden pile removal and installation methods. Underwater noise created during relocation of these structures will be below the fish and marine mammal injury thresholds currently accepted by the NMFS. Potential impacts to the aquatic species would be very short-term and not injurious (FHWA 2012).

5.7 Dredge Material Disposal Sites

Direct effects to listed species from in-water placement of dredged material at the permitted LZA and ODMDS dredge disposal locations are similar to the short-term impacts of turbidity, noise, disturbance or burial of benthic prey species, and habitat impacts described above for dredging. At its inception, the LZA placement area is located south of the barrier islands and was specifically positioned to maximize sand migration to supplement the barrier island system. Dredged material placed in this area is reintroduced to the existing east-to-west sediment transportation system. Suitable, sandy material dredged during the proposed Project and placed within the LZA site is considered a BU of dredged material (Atkins North America 2012). Materials placed into the ODMDS meet the USEPA criteria for placement, based on the sediment chemistry and elutriate test results (Anchor QEA 2012).

5.8 Potential Indirect Project Effects

Indirect effects are those that are caused by or result from the proposed Project, are later in time, and are reasonably certain to occur. Widening the existing FNC will provide greater accessibility to existing vessels calling on the public and private facilities located in Bayou Casotte Harbor and will provide a net benefit to vessel transit efficiency within these channels. Indirect effects associated with the proposed Project relate to new nighttime traffic in the channel, which is currently prohibited. This will result in increased noise and propwash during that period. Fish, turtles, and other aquatic species are anticipated to either acclimate to the nighttime noise or vessel traffic or use other areas of Mississippi Sound because these species are highly mobile and boats and vessels currently traverse the Sound and Gulf during nighttime hours. Increased prop scour occurring during low tide events may have some minor impacts on the benthic community in the FNC; however, such disturbances are anticipated to be rare due to the depth of the channel.

5.9 Potential Effects of Interrelated/Interdependent Actions

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions have no independent utility apart from the proposed Project and depend on the proposed Project actions for justification. There are no known potential interrelated/interdependent actions associated with the proposed Project.

5.10 Potential Cumulative Effects

Cumulative effects are effects of future state, tribal, local, or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the Federal action subject to consultation (50 CFR §402.02). The purpose of this cumulative effects list is to aid the USFWS and NMFS in making a jeopardy/no jeopardy determination for a species, preparing BOs, and tracking the environmental conditions throughout the general area. Effect determinations for this proposed Project are not influenced by the cumulative effects listed here.

A comprehensive cumulative impact assessment is presented in the DEIS for the DEIS study area (Atkins North America 2012). From that assessment, it was determined that four projects are deemed as "reasonably foreseeable future actions" to occur in the proposed Project vicinity. These include the Mississippi Integrated Gasification Combined Cycle at Moss Point, VT Halter Marine, BU sites (Greenwood Island, Singing River, and Round Island), and the Port of Gulfport Expansion Project. The Moss Point and VT Halter, Singing River, and Round Island projects are not located in the Action Area; the Greenwood Island site is located just north and west of the Action Area, but is still just outside the Action Area. Therefore, there are no reasonably certain future state, tribal, local, or private activities within the Action Area.

6 SPECIES EFFECTS ANALYSIS AND DETERMINATIONS

This section provides analyses of direct and indirect effects to species and critical habitats, and ESA effect determinations for species and habitats. As previously described, because the proposed Project will take place completely in water within Mississippi Sound, there is no suitable habitat for terrestrial species within the Action Area. As a result, terrestrial species listed by USFWS in Jackson County, as identified in Table 2, are not addressed in this BA.

6.1 Regulatory Basis for ESA Effect Determinations

The effect determination is the conclusion of the analysis of potential direct or indirect effects of the proposed Project together with the potential effects of other activities that are interrelated or interdependent with the proposed Project on listed or proposed species (at the individual level) and/or designated or proposed critical habitat. A formal BO from the USFWS and NMFS will make a determination of jeopardy/no jeopardy to the species at the population level and/or adverse modification/no adverse modification of designated critical habitat, and recommendations on reasonable and prudent alternatives (RPA), as appropriate. Regulatory guidance from the *Final Section 7 Consultation Handbook* (USFWS and NMFS 1998) was used to make the effects determination for the proposed Project as described below.

For listed species and designated critical habitat, the range of conclusions that could result from the effects analysis for the effect determination includes the following:

- **No effect**. This is the appropriate conclusion when the action agency determines its proposed action and any interrelated or interdependent actions will have no direct or indirect effect on listed species or destroy/adversely modify designated critical habitat.
- **May affect, is not likely to adversely affect**. This is the appropriate conclusion when effects of the proposed Project on listed species or critical habitat are expected to be beneficial, insignificant, or discountable. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: 1) be able to meaningfully measure, detect, or evaluate insignificant effects; or 2) expect discountable effects to occur.

- **May affect, is likely to adversely affect**. This is the appropriate conclusion if any adverse effect to listed species or critical habitat may occur as a direct or indirect result of the proposed Project or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or completely beneficial (see definitions of "is not likely to adversely affect"). If the overall effect of the proposed Project is beneficial to listed species or critical habitat, but may also cause some adverse effect on individuals of the listed species or critical habitat segments, then the determination should be "likely to adversely affect."

6.2 Fish

6.2.1 Direct and Indirect Effects to Gulf Sturgeon

The potential impacts to listed species were discussed in detail in Section 5. Potential impacts on Gulf sturgeon as a result of the proposed Project include temporary physical and behavioral impacts from noise, increased turbidity and resuspended sediment, loss of benthic food resources, and entrainment during dredging activities. There are no permanent impacts to Gulf sturgeon associated with the proposed Project and loss of benthic food resources is insignificant relative to available foraging areas. Mechanical and hydraulic cutter head dredging operations typically do not result in direct impacts to Gulf sturgeon. However, a hopper dredge may be used as part of the proposed Project. Hopper dredges are known to adversely impact Gulf sturgeon by risk of entrainment in the suction dragheads. To reduce the possibility of impacts to protected species, industry conservation measures that previously have been successful will be implemented (Section 2.7). Even with the implementation of industry conservation measures and work windows, there is risk of take that is not discountable or insignificant for individuals of Gulf sturgeon from hopper dredging.

6.2.2 Effects Determination to Gulf Sturgeon

Gulf sturgeon are known to occur in Mississippi Sound and in the vicinity of the Action Area. The activities described in this BA will not result in permanent impacts to Gulf sturgeon populations. This proposed Project may temporarily affect Gulf sturgeon for the following reasons:

- Juvenile and/or adult Gulf sturgeon could be present in the Action Area during

dredging activities and become entrained by hopper dredging equipment.
- Temporary noise, turbidity, and resuspended sediments could disrupt Gulf sturgeon in the Action Area.
- Dredging activity and disposal will temporarily disturb or bury benthic communities and could reduce Gulf sturgeon predation within the proposed Project footprint.

The potential for take is reduced by the following factors:

- All work will be conducted during the approved in-water work windows.
- All of the material will be removed from areas adjacent to the existing navigation channel.
- Conservation measures will be employed, as described in Section 2.7, to minimize potential impacts to Gulf sturgeon.
- Turbidity and resuspended sediment generated by material removal and disposal is expected to be minimal and temporary due to strong currents in the navigation channel.
- Any potential reduction of DO concentrations during dredging is expected to be temporary, and DO concentrations in the new deeper depths of the widened navigation channel are not expected to be significant to Gulf sturgeon due to their motility and the availability of suitable habitat in the vicinity.
- Dredged material placement in water at the proposed permitted locations will support natural habitat formation processes.
- Impacts to benthic prey due to dredging activity and disposal are expected to be temporary, and the areal extent of the areas permanently affected is negligible given the available foraging habitat in Mississippi Sound.
- Operations will be stopped temporarily if injured, sick, or dead Gulf sturgeon are located in the Action Area.
- The Port will follow appropriate notification protocol as described in all permits issued for the proposed Project.

The potential for incidental take exists because hopper dredges are known to adversely impact Gulf sturgeon by entrainment and hopper dredging could be used as part of the 7.2 miles of dredging activity, potentially resulting in harm, injury, or harassment to Gulf sturgeon. The effects cannot be described as discountable or insignificant; therefore, it is concluded that this proposed Project:

- **May affect, and is likely to adversely affect** Gulf sturgeon

6.2.3 Direct and Indirect Effects to Gulf Sturgeon Critical Habitat

Potential impacts associated with the proposed Project are described in Section 5. Disturbance of Gulf sturgeon critical habitat is likely, but will not result in permanent adverse conditions. Unit 8 is listed because it contains four of the seven PCEs that identify critical habitat. These four PCEs are as follows: 1) feeding area, 2) sediment quality, 3) water quality, and 4) migration habitat. The non-mobile benthic community within the Action Area would be temporarily adversely impacted as a result of the dredging and disposal operations. However, these impacts will not result in significant overall critical habitat alteration, due to the fact that the areas will recolonize with similar benthic species after completion of the proposed Project and because the impacted area is less than one percent of the total available foraging habitat in Mississippi Sound. No long-term modifications to the dredging areas would result because the dredged material disposed of in the LZA and ODMDS is consistent in sediment quality with that which is currently found at the sites. Material remaining in the channel after the dredging would be consistent with removed materials.

Although the proposed Project includes 7.2 miles of 100-foot widening along an existing channel, the proposed Project footprint is relatively small compared to the total available forage habitat for Gulf sturgeon in Mississippi Sound. The dredged material will be similar in composition to the disposal areas because the material comes from Mississippi Sound. Therefore, no long-term change in community structure is expected to occur.

Dredging and disposal activities are not the only sources of physical disturbance to the benthos affecting macroinfaunal populations. Storm waves, tidal scour, vessel traffic, and trawling activities of commercial bottom fisheries all act to disrupt and suspend the finer sediments in estuarine and nearshore waters. These short-term perturbations, along with the constant sediment discharge of the area river systems, are much more common and, although not as disruptive in volume of sediment moved or deposited locally, are geographically widespread and equally as unpredictable to the infauna as dredging and disposal activities. Turbidity and resuspended sediments are temporarily affected by disposal operations; however, the magnitude of the increases with disposal operations is consistent with those caused by frontal storms. Dramatic fluctuations in invertebrate populations have been documented from natural phenomena in the tidal pass habitat at the mouth of nearby Mobile Bay, which was subject to extreme low river flow (high salinity), hurricane force winds and tides (sediment alteration), and extreme high river flow (low salinity), all within an 18-month period (Johnson 1980; TechCon 1980).

These unpredictable, repeated disturbances act to keep the system in a state of continuous flux and high productivity. Following any disturbance to the benthos resulting in partial or total loss, colonization of shallow water marine sediments progresses in similar fashion. This has been demonstrated for dredging and disposal activities (Salia et al. 1972; Oliver et al. 1977; and Rhoads et al. 1978), pollution abatement studies (Dean and Haskins 1964; Pearson and Rosenberg 1976), and storm-related bottom disturbances (Frankenburg 1971; Boesch et al. 1976; McCall 1978; Maurer and Aprill 1979; and Johnson 1980). Early succession begins within a few days of the cessation of the disturbance with the arrival of swimming crustaceans (i.e., amphipods and cumaceans) and more motile polychaetes and echinoderms, which immigrate into the area as adults from adjacent areas. In addition, species that survived the disturbance and are capable of burrowing through the disrupted sediment layer add to initial recolonization effort. The larvae of relatively opportunistic polychaetes and bivalve mollusks settle randomly or preferentially onto the new substratum from the overlying water column during seasonal recruitment periods. The latter are characterized by short generation times, small size, high fecundity, and high larval availability. These species most commonly experience high mortality and may disappear locally as a result of competition and/or predation from the more motile immigrants to an area (Barry A. Vittor and Associates 1982). Recolonization timing may depend on depth; overall, resources are expected to recover quickly at shallower depths (9 months) and more slowly at greater depths (up to 8 years) (Bolam et al. 2010; Bolam and Rees 2003; Newell et al. 1998; Sheridan 1999).

Regarding the PCE of migratory passage, the primary migration routes through the geographic area would be in the nearshore area near the river mouths or through the barrier island passes. The proposed Project is occurring in an open-water environment allowing sufficient area for passage of individuals. No significant short-term or long-term impacts to the PCE migratory passage have been identified. Impacts to the PCEs winter-feeding habitat, water quality, and sediment quality would be short-term. Although long-term impacts to the PCE for feeding habitat have been identified, they would be insignificant to overall critical habitat.

6.2.4 Effects Determination for Gulf Sturgeon Critical Habitat

Portions of the Action Area within Gulf sturgeon critical habitat include the area of channel widening and the LZA dredge disposal area. The ODMDS dredge disposal area is located outside the critical habitat boundary. Of the potential impacts to Gulf sturgeon critical habitat PCEs, long-term impacts are identified, due to permanent conversion to deeper water habitats, but these effects are not significant to overall critical habitat. Impacts to the water quality, sediment quality, and migration habitat PCEs will be localized and temporary. Therefore, it is concluded that this proposed Project:

- **May affect, but is not likely to adversely affect** designated Gulf sturgeon critical habitat

6.3 Marine Mammals

6.3.1 Direct and Indirect Effects to Whale Species

Potential impacts associated with the proposed Project are described in Section 5. The occurrence of blue, finback, humpback, and sei whales have been documented in the Gulf of Mexico. Sperm whales are present in the Gulf of Mexico year-round. However, depth and accessibility typically preclude the presence of these whale species in Mississippi Sound. None of the listed whale species are expected to occur in the Action Area, due to the lack of water depth in Mississippi Sound; therefore, there are no identified direct or indirect effects on blue, finback, humpback, sei, and sperm whales.

6.3.2 Effects Determination for Whale Species

Blue, finback, humpback, sei, and sperm whales do not typically use Mississippi Sound to breed or feed, and it is highly unlikely that they would enter the Action Area. Because of the lack of water depth and the presence of human activity in the navigation channel, it is highly unlikely that these whale species will be present in the Action Area during construction. Therefore, it is concluded that this proposed Project will have the following effects:

- **No effect on blue whale**
- **No effect on finback whale**
- **No effect on humpback whale**
- **No effect on sei whale**
- **No effect on sperm whale**

6.3.3 Direct and Indirect Effects to Manatee

Potential impacts associated with the proposed Project are described in Section 5. The manatee may migrate through the Action Area, but the species typically concentrates near coastal embayment's. The major threat to manatee is collision with watercraft. Potential for impacts from dredging and disposal, as well as, potential collisions with vessel traffic while present, should be minimal, due to the limited use of the Action Area by manatees. Due to underwater noise from construction activities and elevated turbidity/TSS levels, active dredging and disposal activities may disturb these animals and cause them to alter their route. These temporary impacts would likely cause the manatee to avoid the area, but would not prevent their passage. Given their likely absence, feeding habits, and very low likelihood of interaction, direct or indirect effects on manatee are unlikely.

6.3.4 Effects Determination for Manatee

The West Indian manatee is known to migrate through the Action Area between Florida and Louisiana. Manatees favor coastal habitat associated with rivers, estuaries, and nearshore areas. It is anticipated this species would avoid the construction areas, due to noise and activity. Therefore, it is concluded that this proposed Project:

- **May affect, but is not likely to adversely affect** West Indian manatee

6.4 Sea Turtles

6.4.1 Direct and Indirect Effects to Sea Turtles

The potential impacts to listed species were discussed in detail in Section 5. Potential impacts on sea turtle species as a result of the proposed Project include temporary physical and behavioral impacts from noise, increased turbidity and resuspended sediment, loss of benthic food resources, and entrainment during dredging activities. There are no long-term impacts to sea turtles associated with the proposed Project. Mechanical dredge and hydraulic cutter head dredge typically do not result in direct impacts to sea turtles. A hopper dredge may be used as part of the proposed Project. Hopper dredges are known to adversely impact sea turtle species by entrainment in the suction dragheads. To reduce the possibility of impacts to protected species, industry conservation measures will be implemented (Section 2.7); however, even with the implementation of industry conservation measures and work windows, a low risk of take of individuals of listed sea turtle species may exist using the hopper dredging method (See Section 2.7).

6.4.2 Effects Determination for Sea Turtles

All five listed sea turtle species (green, hawksbill, Kemp's ridley, leatherback, and loggerhead) have been documented, to varying degrees, in Mississippi Sound and in the vicinity of the Action Area. The potential impacts on sea turtle species as a result of the proposed Project include entrainment during dredging activities and temporary physical and behavioral impacts from noise, increased turbidity and resuspended sediment, and loss of benthic food resources. The activities described in this BA will not result in long-term, permanent impacts to listed sea turtle populations. This proposed Project may affect sea turtle species for the following reasons:

- Even if project work windows are followed, a low number of juvenile or adult sea turtles could be present in the Action Area during dredging activities and become entrained by hopper dredging equipment.
- Temporary noise, turbidity, and resuspended sediments could disrupt sea turtle behavior in the Action Area.
- Dredging activity and disposal will temporarily disturb benthic communities and have the potential to affect sea turtle prey availability within the proposed Project footprint.

The potential for take is reduced by the following factors:

- All work will be conducted during the approved in-water work windows, to the extent possible.
- Dredging within any window would follow the current BO guidelines for trawling.

- All of the material will be removed from areas adjacent to the existing navigation channel.
- Conservation measures will be employed, as described in Section 2, to minimize potential impacts to listed sea turtles.
- Turbidity generated by material removal and disposal is expected to be temporary, due to strong currents typically existing in the navigation channel.
- Reduction of DO concentrations is expected to be temporary, due to strong currents typically existing in the navigation channel.
- Dredged material placement in water at the proposed permitted locations will support habitat formation processes.
- Impacts to benthic prey due to dredging activity and disposal are expected to be short-term and localized.
- Operations will be stopped temporarily if injured, sick, or dead listed species are located in the area.
- The Port will follow appropriate notification protocol for any injured, sick, or dead species as described in permits issued for the proposed Project.

The potential for incidental take exists because hopper dredges are known to adversely impact sea turtles by entrainment, and hopper dredging could be used as part of the 7.2 miles of dredging activity, potentially resulting in harm, injury, or harassment to sea turtle species. However, leatherback sea turtles are highly unlikely to be present in the Action Area. Therefore, it is concluded that this proposed Project has the following effects:

- **May affect, and is likely to adversely affect** green sea turtles
- **May affect, and is likely to adversely affect** hawksbill sea turtles
- **May affect, and is likely to adversely affect** Kemp's ridley sea turtles
- **May affect, but is *not* likely to adversely affect** leatherback sea turtles
- **May affect, and is likely to adversely affect** loggerhead sea turtles

6.5 Incidental Take Analysis

The potential for incidental take exists because hopper dredges are known to adversely impact sea turtles and Gulf sturgeon by entrainment, and hopper dredging could be used as part of the 7.2 miles of dredging activity. Therefore, the proposed Project could result in harm, injury, or harassment to sea turtle species or Gulf sturgeon. The use of the specified conservation measures and best management practices (BMPs) during construction activities are expected to reduce the potential for take. However, incidental take of green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtle species and Gulf sturgeon could occur.

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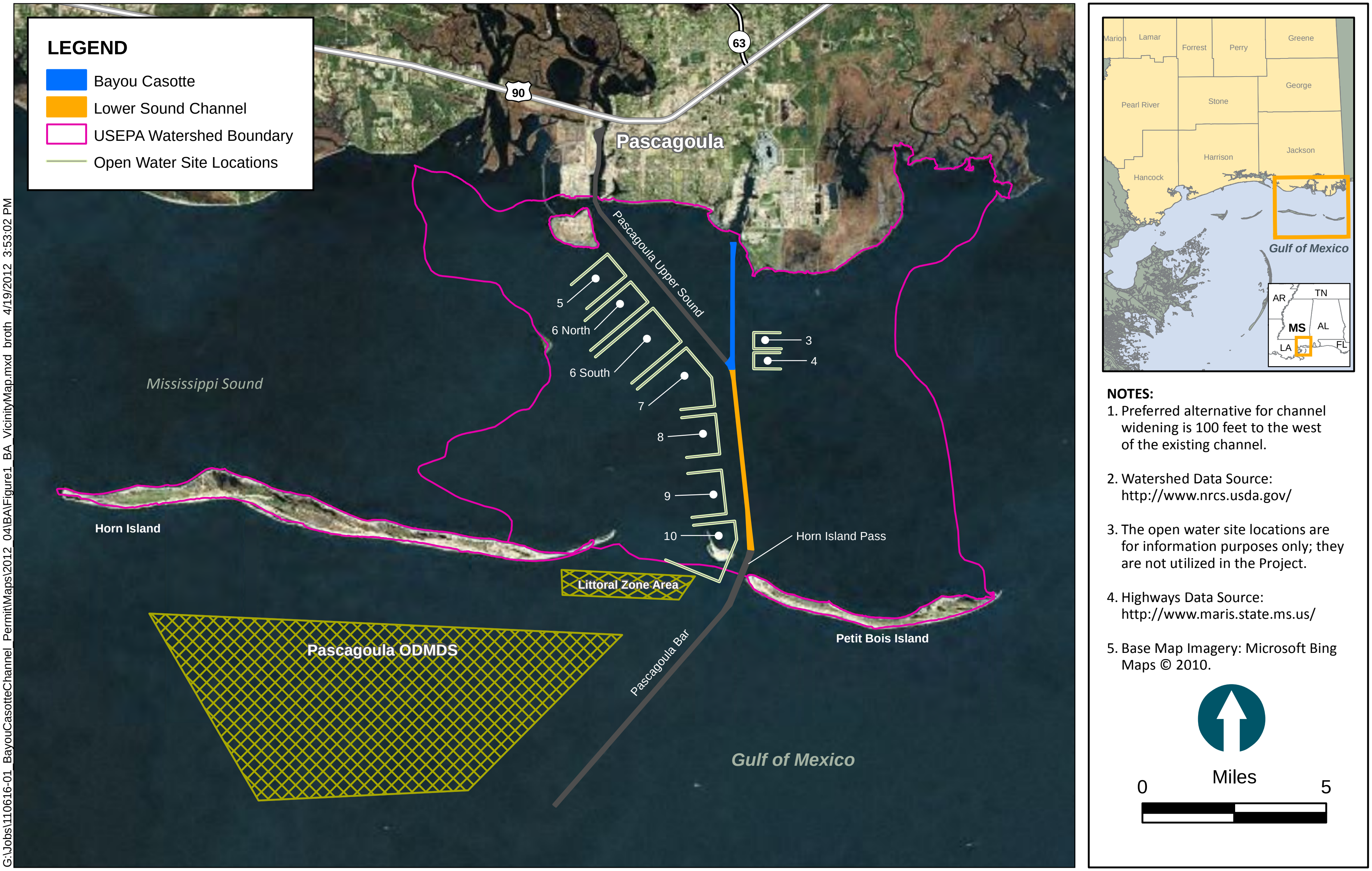
FIGURES



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NOTES:

1. Preferred alternative for channel widening is 100 feet to the west of the existing channel.
2. Watershed Data Source: http://www.nrcs.usda.gov/
3. The open water site locations are for information purposes only; they are not utilized in the Project.
4. Highways Data Source: http://www.maris.state.ms.us/
5. Base Map Imagery: Microsoft Bing Maps © 2010.

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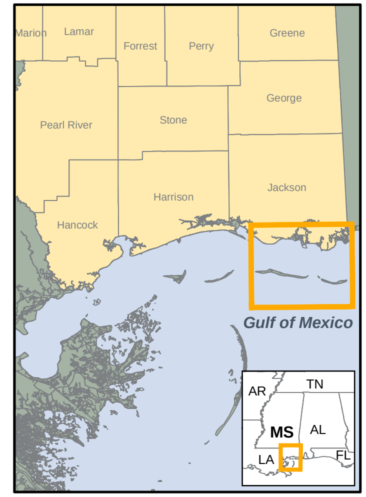
Figure 1
Vicinity Map and Existing Channel
Biological Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project



NOTES:

1. Preferred alternative for channel widening is 100 feet to the west of the existing channel.
2. Pipeline alignment is approximate. A spare (inactive) pipeline lies along the same alignment and may require removal as part of the Project.
3. Base Map Imagery: Microsoft Bing Maps © 2010.

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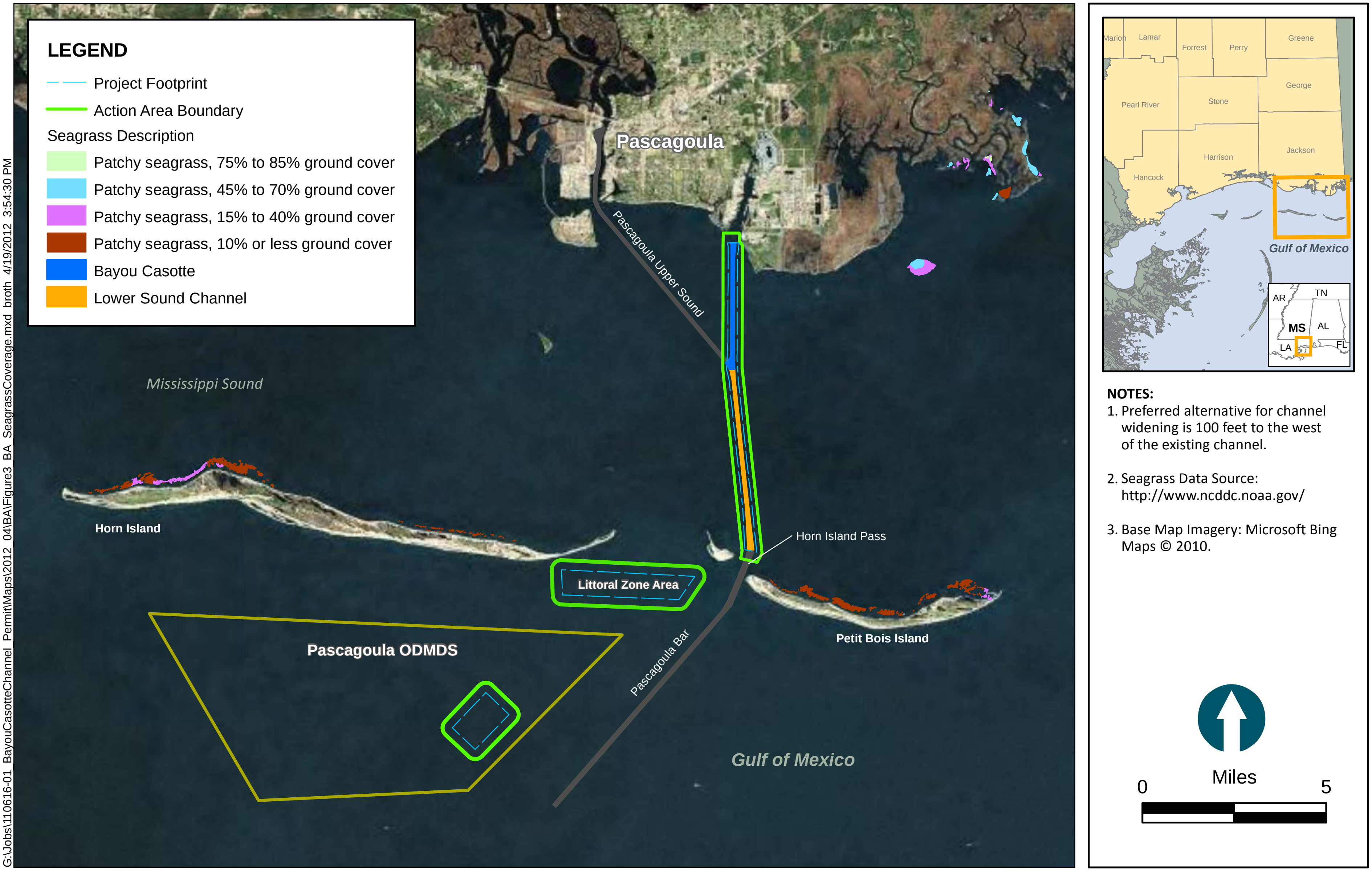
Figure 2
Project Location and Action Area
Biological Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project



NOTES:

1. Preferred alternative for channel widening is 100 feet to the west of the existing channel.
2. Seagrass Data Source: http://www.ncddc.noaa.gov/
3. Base Map Imagery: Microsoft Bing Maps © 2010.

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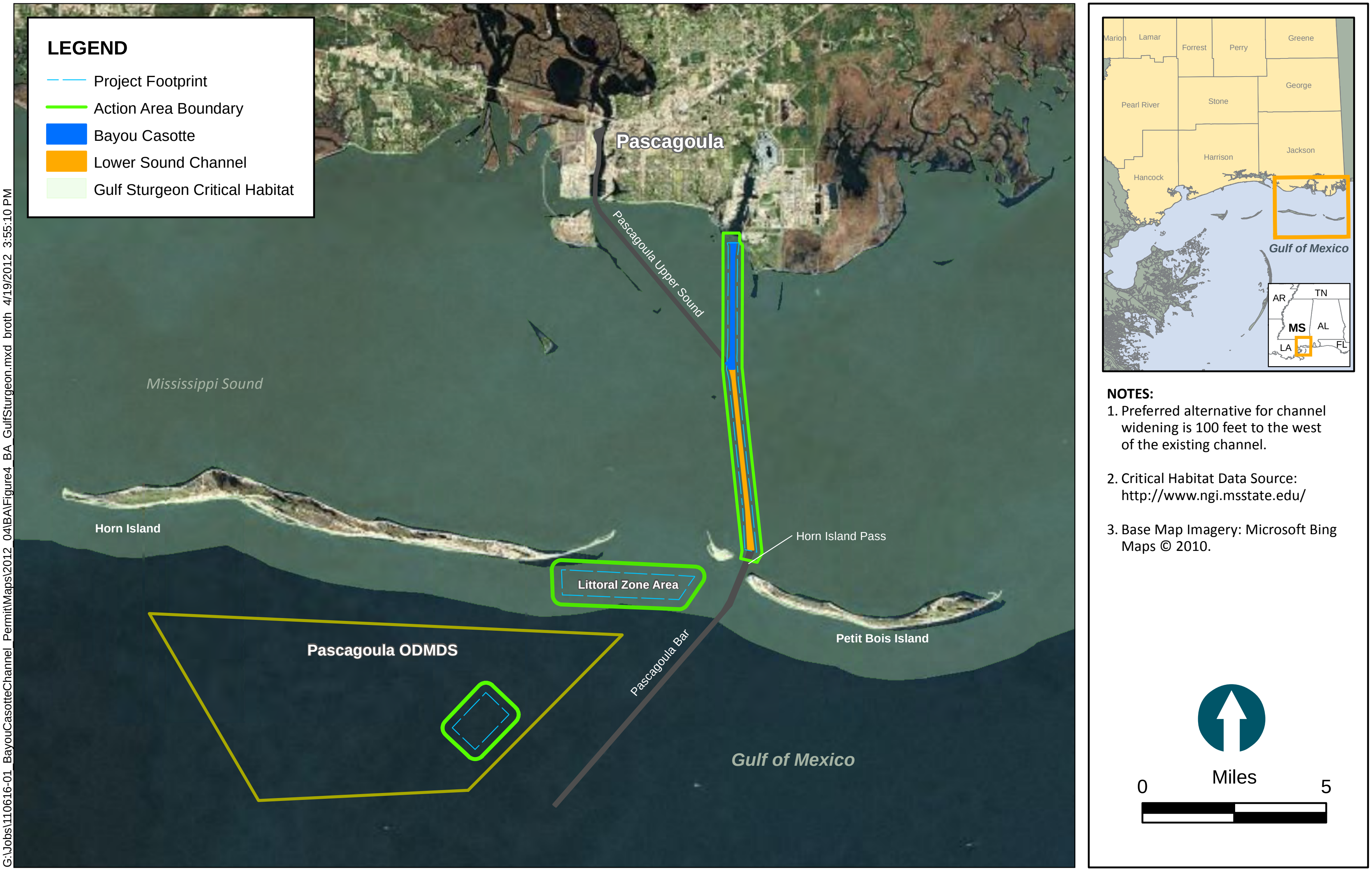
Figure 3
Seagrass Coverage
Biological Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project



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NOTES:

1. Preferred alternative for channel widening is 100 feet to the west of the existing channel.
2. Critical Habitat Data Source: http://www.ngi.msstate.edu/
3. Base Map Imagery: Microsoft Bing Maps © 2010.

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Figure 4
Critical Habitat for Gulf Sturgeon
Biological Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project

ESSENTIAL FISH HABITAT ASSESSMENT
BAYOU CASOTTE AND LOWER PASCAGOULA SOUND CHANNEL WIDENING PROJECT

On behalf of:

Jackson County Port Authority – Port of Pascagoula

3033 Pascagoula Street

Pascagoula, Mississippi 39567

Prepared by

Anchor QEA, LLC

614 Magnolia Avenue

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April 2012

ESSENTIAL FISH HABITAT ASSESSMENT BAYOU CASOTTE AND LOWER PASCAGOULA SOUND CHANNEL WIDENING PROJECT

On behalf of:

Jackson County Port Authority – Port of Pascagoula

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April 2012

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LIST OF ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
Anchor QEA	Anchor QEA, LLC
BA	biological assessment
BU	beneficial use
cy	cubic yard
DEIS	Draft Environmental Impact Statement
DO	dissolved oxygen
EA	EA Engineering, Science, and Technology
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FMC	Fishery Management Councils
FMP	Fishery Management Plan
FNC	Federal Navigation Channel
FWC	Fish and Wildlife Conservation Commission
GIWW	Gulf Intracoastal Waterway
GMFMC	Gulf of Mexico Fishery Management Council
HAPC	habitat areas of particular concern
LZA	Littoral Zone Area
mcy	million cubic yards
MDEQ	Mississippi Department of Environmental Quality
mg/L	milligrams per liter
MLLW	mean lower low water
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ODMDS	Ocean Dredged Material Disposal Site
Port	Port of Pascagoula
ppt	parts per thousand
proposed Project	Bayou Casotte and Lower Pascagoula Sound Channel Widening Project

RPA	reasonable and prudent alternative
RPM	reasonable and prudent measure
SAV	submerged aquatic vegetation
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
YOY	young-of-the year

1 INTRODUCTION

In compliance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Mobile District U.S. Army Corps of Engineers (USACE) with support from the Port of Pascagoula (Port) is providing this assessment of the potential effects of the proposed Bayou Casotte and Lower Pascagoula Sound Channel Widening Project (proposed Project) on essential fish habitat (EFH). The proposed Project involves the construction of the channel, which is a regulatory action rather than maintenance of the channel, which the USACE is evaluating under the Civil Works Program. Concurrently, the USACE is evaluating whether to assume maintenance of the proposed Project under a Section 204(f) study. If the USACE evaluation is favorable, adopted, and then authorized, the proposed Project will be constructed; if not, the proposed Project will not be constructed. The proposed Project will provide greater accessibility to all vessels calling on the public and private facilities located in Bayou Casotte Harbor.

EFH for the coastal migratory pelagic fishery, red drum fishery, reef fish fishery, shrimp fishery, and highly migratory species are potentially affected by the proposed Project (Gulf of Mexico Fishery Management Council (GMFMC) 2004 and GMFMC 2005). The stone crab fishery was listed in GMFMC (2004), but regulations under the MSA were removed (50 CFR Part 654 September 15, 2011). National Marine Fisheries Service (NMFS) issued this final rule to repeal the Fishery Management Plan (FMP) for the Stone Crab Fishery of the Gulf of Mexico and remove its implementing regulations, as requested by the GMFMC. The stone crab fishery takes place primarily in state waters off the coast of Florida, and the Florida Fish and Wildlife Conservation Commission (FWC) is extending its management of the fishery into federal waters.

This document contains the EFH Assessment for the proposed Project as set forth in the regulations (50 CFR 600.920[g]), including the following:

- A description of the proposed action
- A description of the aquatic habitat affected
- Discussion of the life history information for fish species with designated EFH in the proposed Project area
- An analysis of potential adverse effects of the proposed Project on EFH

- Conservation measures to minimize the effects of the proposed Project on EFH
- EFH effect determinations
- Proposed mitigation, if applicable

1.1 Magnuson-Stevens Fishery Conservation and Management Act

The MSA, first enacted in 1976, amended in 1996, and reauthorized in 2006, promotes sustainable fish conservation and management. Under MSA, NMFS was granted legislative authority to establish eight regional Fishery Management Councils (FMCs) responsible for the proper management and harvest of fish and shellfish resources within the waters of the United States. Each FMC was required to prepare an FMP for each fishery under its authority that requires conservation and management. The Mississippi Sound system and nearshore Gulf of Mexico is within the management jurisdiction of the Gulf FMC.

The 1996 MSA stresses the importance of habitat protection to healthy fisheries. One purpose of the MSA is to promote the protection of EFH in the review of projects conducted under federal permits, licenses, or other authorities that affect or potentially will affect these habitats. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (NMFS 2007). The EFH regulations (at 50 CFR 600 Subpart J) provide additional interpretation of the definition of EFH: "Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fishes and may include areas historically used by fishes. Substrate includes sediment, hard bottom, structures underlying the waters, and any associated biological communities. Necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. Spawning, breeding, feeding, or growth to maturity covers all habitat types used by a species throughout its life cycle."

Requirements in the MSA direct federal agencies to consult with NMFS when any of their activities may have an adverse effect on EFH. The EFH regulations define an adverse effect as "any impact which reduces quality and/or quantity of EFH and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions."

1.2 Site Location and Description

The Port is located on the Gulf of Mexico in the City of Pascagoula in Jackson County, Mississippi (Figure 1). The Port facility includes two harbors: the Pascagoula River Harbor and the Bayou Casotte Harbor. The Pascagoula Harbor is located on the western side of the Port property and leads north into the Pascagoula River. The Bayou Casotte Harbor is located on the eastern side of the city. Both of these sites are located south of U.S. Highway 90. Mississippi State Highway 619 and State Highway 611 provide land access into the Pascagoula River Harbor and Bayou Casotte Harbor, respectively.

Both harbors include berthing and docking facilities for loading and unloading vessels and vessel repair and construction. The Pascagoula River Harbor facilities include 436,000 square feet of covered storage, cold storage facilities, and open storage adjacent to the berthing and docking areas (Anchor QEA, LLC [Anchor QEA] 2011a). The Bayou Casotte Harbor facilities provide approximately 4 acres of paved and 10 acres of unpaved open storage, and two 175,000-square-foot transits sheds adjacent to their terminals.

The Bayou Casotte Channel is located south of the Bayou Casotte Harbor in Mississippi Sound. Mississippi Sound extends from Lake Borgne, Louisiana, to Mobile Bay, Alabama, and is geographically separated from the Gulf of Mexico by a series of narrow islands and sand bars. Vessel access to Bayou Casotte and Pascagoula harbors is provided by the Pascagoula Sound Channels (i.e., Lower Sound Channel and Upper Sound Channel) which extend approximately 18 miles offshore from the Port. Ships calling at the Port enter Mississippi Sound from the Gulf of Mexico via the Bar and Horn Island Pass channels, passing between Horn Island on the west and Petit Bois Island on the east. This channel joins the Lower Sound Channel, which continues northward and splits at the "Y" into the Upper Sound Channel to the west and the Bayou Casotte Channel to the east. The Upper Sound Channel provides vessel access to the Pascagoula River Channel.

1.3 Proposed Action

The proposed action is limited to the marine environment of Mississippi Sound. Proposed Project activities consist of in-water work associated with widening the existing Federal Navigation Channel (FNC), including excavation via dredge equipment, relocation of the dredged material, and relocation of aids to navigation. No inland or upland activities are proposed. The proposed Project will improve habitat conditions along the barrier islands through the beneficial use of the sand component of the dredged material.

Currently, the existing Bayou Casotte and Lower Sound FNC segments are maintained at a depth of -42 feet below mean lower low water (MLLW) and a width of 350 feet. During a dredging event, 2 feet of allowable overdepth may be dredged to allow for the vertical inaccuracies of the dredging process. As part of the proposed Project, an additional 100 feet will be added to the overall width of the existing Bayou Casotte and Lower Sound segments to the lower turning basin for approximately 7.2 miles. The 100 feet of additional channel width will occur on the west side of the existing channel.

The purpose of the proposed Project is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the south turning basin in Bayou Casotte. One key need for this proposed Project stems from the fact that the current width of the channel imposes transit limitations for marine vessel traffic that delays vessels and fosters inefficient use of the channels and harbor. Frequently, wind and current conditions restrict how vessels traverse this narrow channel. The impacts include diversions to other ports and delays offshore awaiting transit, which are not effective and efficient use of the vessel and the harbor facilities. Therefore, the proposed Project is intended to:

- Reconfigure the channel to alleviate the current transit restrictions and increase travel efficiencies for existing vessel transit.
- Improve conditions for Port operations by increasing the availability of the channel for existing vessel use under a much wider range of environmental conditions than with the existing channel.

The proposed Project is needed to reduce existing transit restrictions along Pascagoula Lower Sound and Bayou Casotte navigation channels. Because the proposed Project is being constructed to alleviate an existing transit workaround, the proposed Project is not expected to increase overall vessel traffic volumes or increase vessel sizes using the channels or harbor. New nighttime traffic is anticipated, as the nighttime restrictions currently in place are expected to be lifted.

In addition to dredging, the existing U.S. Coast Guard (USCG) center line range markers and aids to navigation along the west side of the channel would require relocation. No active pipeline relocations are anticipated. A single spare line was installed in the same open trench as the 12-inch active line, when constructed in the 1960s. The spare line may be removed from the trench as part of the dredging process if the line is not deep enough across the channel limits.

The total dredging quantity is estimated to be 3.4 million cubic yards (mcy; Table 1). Dredged material management would include placement of approximately 124,000 cubic yards of the dredged material in the designated Littoral Zone Area (LZA) located east and south of Horn Island, and the remainder of the material (approximately 3.3 mcy) at the Pascagoula Ocean Dredged Material Disposal Site (ODMDS) south of Horn Island (Table 2).

Table 1

Channel Widening Impact Area and Dredge Areas and Volumes

Location of Channel Widening	Length (feet)	Width (feet)	Area (square feet)	Area (acres)	Volume (cy)
Upper Sound	14,300	100	1,431,000	32.86	1,359,464
Lower Sound	18,015	100	1,801,000	41.36	1,711,433
Transition Area	4,265	70	298,550	6.86	283,625
HIP Bend Easing Area	165	50	4,125	0.1	31,616
Total	**36,745**	**NA**	**3,534,675**	**81.18**	**3,386,100**

Note:
cy = cubic yards

Table 2

Dredged Material Disposal Areas and Volumes

Location of Channel Widening	Volume (cy)	Deposit Thickness (feet)	Area (square feet)	Area (acres)
Littoral Zone Placement Area (Beneficial Use)	124,411	2	1,679,544	38.56
ODMDS Placement Area	3,261,700	3	30,475,332	699.62
Total	**3,386,100**	**NA**	**32,154,876**	**738.18**

Notes:
cy = cubic yards
ODMDS = Ocean Dredged Material Disposal Site

Dredging activities would be performed by one of the following three options:

- Hopper dredge
- Mechanical dredge
- Hydraulic cutter head dredge

Placement methods are dependent on the dredging method chosen. Hopper dredges are self-propelled and capable of storing, transporting, and placing the dredged material at a given location. With mechanical dredges, the sediments are excavated with a bucket (e.g., clamshell) and placed into split-hull or bottom dump barges, which are then transported to the placement site, emptied, and returned to the dredging site for reloading. Hydraulic cutter head dredges transport and discharge the excavated sediment slurry through a pipeline to the intended placement location. Typically, pipeline length and path, sea conditions, and fuel consumption are limiting factors for hydraulic dredging. A maximum distance of 2 miles can be achieved under normal conditions; however, the distance can be increased to more than 20 miles through the use of booster pumps (Welp 2011; Shiner Moseley and Associates 2005). The discharge pipe termination point can be controlled by a spill barge that adjusts and tracks the placement location during dredging. As distances increase, so do fuel consumption and potential leaks of water and dredge slurry from the dredge pipe joints.

The proposed Project will require relocating all of the aids to navigation along the west side of the channel as well as four center line range markers. The markers are either a single wooden pile structure with a numbered board and light, or a lighted steel or composite buoy anchored with a concrete weight and steel chain, adjacent to the channel. The four range markers each consist of five wooden piles with a platform to support a metal tower. The center line signage is attached to the metal tower.

The center line range markers will be removed as the dredging proceeds and will be replaced after the channel segment is complete either as part of routine maintenance of the markers by the USCG or by the construction contractor. The piles will be removed with a crane and reinstalled using impact pile driving. The channel buoys and anchors will be moved by a barge-mounted crane and re-positioned based on the construction operation and completion. The center line range markers will be relocated approximately 50 feet west of their existing locations, re-using the salvageable materials.

1.4 Action Area

For the purpose of analysis in this EFH Assessment, the Action Area is defined as the geographic area that contains resources potentially affected by the proposed Project (Figure 2). The Action Area for this EFH Assessment is the same as that given in the Biological Assessment (BA) (Anchor QEA 2010b) for the proposed Project, and includes the following:

- Bayou Casotte and Pascagoula Lower Sound FNC segments proposed for widening
- Potential dredged material placement sites
  - LZA Beneficial Use (BU) site (south and east of Horn Island)
  - Pascagoula ODMDS
- A buffer of 1,000 feet in addition to the channel footprint and dredged material placement sites to include the Mississippi Department of Environmental Quality (MDEQ) recommendations for mixing zones (750 feet)

2 EFH IN THE MISSISSIPPI SOUND AND ACTION AREA

EFH in the Action Area includes water and substrates (mud, sand, shell, rock, and associated biological communities), subtidal vegetation (seagrasses and algae), and adjacent intertidal vegetation (wetlands). More specifically, EFH consists of areas of higher species density, based on the National Oceanic and Atmospheric Administration (NOAA) Atlas and functional relationships analysis for the Red Drum, Reef Fish, Coastal Migratory Pelagics, Shrimp, and Highly Migratory Species (GMFMC 2004; NMFS 2006). Maps of EFH in the Action Area are shown on Figures 4 through 13.

The following sections provide a description of EFH in the Action Area. More detailed descriptions of the affected environment and the environmental baseline can be found in the Draft Environmental Impact Statement (DEIS) and Endangered Species Act (ESA) BA (Atkins North America 2012; Anchor QEA 2012b).

The Action Area is located in Mississippi Sound; an estuarine system extending from Lake Borgne, Louisiana, to Mobile Bay, Alabama, encompassing approximately 1,850 square miles. The southern boundary of the Sound consists of widely spaced barrier islands (Cat, Ship, Horn, Sand, Petit Bois, and Dauphin islands). Navigation channels for Gulfport, Biloxi, and Pascagoula cross the Sound north to south while the Gulf Intracoastal Waterway (GIWW) spans the Sound from east to west.

2.1 Bathymetry

Typical water depths in the northern and western portion of Mississippi Sound are shallow, ranging from approximately three to nine feet (Blumberg et al. 2000). Where the Pascagoula Harbor Navigation Channel extends across the eastern Mississippi Sound, water depths are approximately 13 feet or less. Depths in the southern half of the Sound range from approximately 13 to 20 feet.

The Pascagoula Harbor Navigation Channel passes between Horn Island and Petit Bois Island through Horn Island Pass. The islands are separated by approximately 3 nautical miles of open water, which range in depth from 1 to 20 feet. South of Horn Island, natural depths range from approximately 20 to 45 feet in the vicinity of the ship channel. Based on existing data (NOAA 2008; USACE 2012), the bathymetry of the Action Area varies from -10 feet MLLW in the upper and middle regions to -20 feet MLLW near the barrier islands. Below Horn and Petit Bois Islands, the bathymetry varies from -10 feet MLLW to -50 feet MLLW in the vicinity of the Pascagoula ODMDS.

The LZA is located between the -14-foot-depth and -22-foot-depth contours southeast of the east end of Horn Island. The Pascagoula ODMDS is an area of approximately 18.5 square miles, with depths varying from approximately 30 feet in the north to more than 60 feet in the southern section.

2.2 Water

The water within Mississippi Sound is influenced by several factors, including the discharge of freshwater from rivers, variations in tide and currents, and wind. Salinity, dissolved oxygen (DO), water temperature, and turbidity are all affected by freshwater inputs from the Pascagoula River and other tributaries, and the Gulf of Mexico tides. Because the barrier island system is relatively open, water passes into the Sound through the deep passes between barrier islands with the help of tidal forces. Tides in the Sound average 1.4 feet and exhibit a mixed diurnal semidiurnal pattern. Spring tides often exceed a range of 2.0 feet and neap tides may be less than 0.1 foot in range. The tides are a complex mixture of the Gulf tide and a partial reflection of the tidal waves from the barrier islands (Seim et al. 1987). In addition to freshwater inflows and tidal oscillations, winds can play an important role in water movement. Strong southerly or onshore winds associated with low pressure systems can bring in additional water from the Gulf and produce high water levels nearshore. Storm surges can transport large quantities of higher salinity waters into the Sound while heavy rains can reduce salinity in the Sound.

Details on water temperature, salinity, DO, and total suspended solids (TSS) in Mississippi Sound are given in the DEIS and are summarized here (Atkins North America 2012). Summaries of water contaminant analytes in the Action Area are given in the ESA BA in Section 3.2.1 (Anchor QEA 2012b).

Water temperatures measured in the Bayou Casotte and Pascagoula Navigation Channels varied from 63 to 90 degrees Fahrenheit (°F) with only 1 percent of readings exceeding

MDEQ water quality standards (USEPA 2011; USACE 2011a). Salinity information from MDEQ suggests that the Action Area is characterized by a polyhaline water mass at depths greater than approximately 5 feet, while surface waters can vary (dependent upon rainfall) between oligohaline and polyhaline conditions. At times when surface waters are fresher, bottom waters most likely will still have higher salinities, which can result in density stratification, likely resulting in lower concentrations of DO in bottom waters. Areas deeper than approximately 14 feet often have DO concentrations below the 4.0 mg/L MDEQ water quality standards (MDEQ 2007) and areas deeper than 19.2 feet are typically expected to be hypoxic (DO concentrations less than 2.0 mg/L) (Atkins North America 2012). DO has been measured in the vicinity of the proposed Project and ranged between 0.6 and 9.9 mg/L, with an average of 6.0 mg/L (USEPA 2011; USACE 2011a). All the samples collected in the study area were instantaneous, and therefore the daily average standard was not an appropriate metric to use for comparison to MDEQ water quality standards. However, using the instantaneous reading standard, 39 of the 314 DO samples, regardless of water depth, fell below 4.0 mg/L indicating insufficient DO in 12 percent of the samples analyzed. Additionally, 23 of the 87 bottom water samples fell below 4.0 mg/L, including five of the bottom water samples with values below 2.0 mg/L, indicating hypoxic conditions are present at times.

TSS concentrations ranged between 0 mg/L and 88 mg/L with an average value of 24.3 mg/L (USEPA 2011). There is no MDEQ water quality standard for TSS, but prior studies have shown that the growth of oyster eggs and/or larvae is reduced at silt concentrations (silt being a component of overall TSS) above 180 mg/L (Davis and Hidu 1969). Concentrations of TSS in the Bayou Casotte proposed Project area would not be expected to be problematic to filter feeders such as oysters. In general, turbidity is naturally high in Mississippi Sound due to freshwater inputs, tides, and currents.

2.3 Substrate

Sediments dredged from navigation channels in the Pascagoula Harbor include an ocean source (sandy, littoral materials), river source (fine-grained sands, silts, and clays derived from easily eroded soils from the upper Pascagoula River basin), and mixtures of both. Shoals occur where specific physical factors promote deposition or movement of sediments.

These factors may vary spatially and temporally. The LZA and ODMDS sites are dynamic sites, and sediments with higher sand compositions are continually depositing and eroding away (Anchor QEA 2012a).

Previous investigations (EA Engineering, Science, and Technology [EA] 2011a, 2011b) characterized the sediments from the Action Area. As part of the bulk sediment testing performed for the sediment characterization (EA 2011b), the physical characteristics (i.e., grain size, specific gravity, and percent solids) were analyzed. The sediment analyzed from along the Bayou Casotte Channel exhibits high silt and clay fraction (ranges from 70.2 percent to 97.5 percent). A greater variation is seen in the sediments sampled along the Lower Sound Channel, as the two samples near Horn Island exhibit a sand fraction that is greater than the other sample locations (85 to 91 percent). In general, the geotechnical analyses indicate that approximately 90 percent of the proposed material is silts and clays, with increasing amounts of sand closer to the barrier island chain (EA 2011b).

Sediment chemistry and elutriate testing was conducted as part of the DMMP (Anchor QEA 2012a). Results from this testing indicate that materials dredged and placed into the ODMDS will meet the USEPA criteria for placement.

2.4 Subtidal Vegetation

Currently, subtidal vegetation is sparse in Mississippi Sound and consists mostly of seagrasses. Extant seagrass populations off of the coast of Mississippi consist almost exclusively of shoal grass (*Halodule wrightii*). Historically, populations of shoal grass, star grass (*Halophila engelmannii*), wigeon grass (*Ruppia maritima*), manatee grass (*Syringodium filiforme*), and turtle grass (*Thalassia testudinum*) were present and abundant along the northern shores of the Mississippi barrier islands (Handley et al. 2007). Overall, Mississippi has lost half of the seagrass area since 1968 and it is now mostly composed of one seagrass species: shoal grass. Causes of seagrass loss are likely the cumulative effects of human activities in the coastal environment including recreational, commercial, and land-use changes.

Subtidal vegetation typically occurs in less turbid, moderately saline habitats of the nearshore zone, north of the barrier islands. Approximately 652 acres of subtidal vegetation occur within proximity to the proposed Project on the north shorelines of the barrier islands and northeast of Bayou Casotte Channel near and within Point Aux Chennes Bay (Figure 3). There are no documented continuous seagrass beds, only patchy distributed beds located in the vicinity of the Action Area (Figure 3). Based on existing seagrass distribution data, no seagrasses appear to occur within the Action Area of the proposed Project due to depth, water clarity, and possibly low salinity levels (Handley et al. 2007).

2.5 Intertidal Vegetation

No intertidal vegetation occurs in the Action Area of the proposed Project; however, estuarine wetlands (intertidal salt, brackish, and tidally influenced freshwater marshes) create a fringe along the coast, barrier islands, and the mouths of streams and bays (Handley et al. 2007). Most estuarine wetlands in the Action Area occur within estuaries of the Pascagoula River, Bayou Casotte, and other streams and bayous that enter Mississippi Sound, and these wetlands are mapped as estuarine emergent and estuarine scrub-shrub (USFWS 2012). Additional information on intertidal vegetation in the vicinity of the proposed Project can be found in the DEIS (Atkins North America 2012).

2.6 Habitat Areas of Particular Concern

Habitat areas of particular concern (HAPC) are designated as part of the Gulf of Mexico Fishery Management Plan (FMP) (GMFMC 2004). An HAPC is a localized area of EFH that is especially ecologically important, sensitive, stressed, or rare when compared to the rest of a species EFH geographic range. No HAPC occur in the Action Area of the proposed Project. The nearest HAPC (i.e., Madison Swanson Marine Protected Area) is approximately 150 miles to the west.

3 EFH FISHERIES AND SPECIES

Mississippi Sound in the area of the Bayou Casotte Channel has been identified as EFH for five distinct fisheries and 21 species of fish and shellfish (Table 3; Figures 4 through 13).

Table 3
Species with EFH in Study Area and Life Stage Usage

Fishery and Species	Egg	Larvae/Neonate (sharks)	Juvenile	Adult
Coastal Migratory Pelagic Fishery				
Cobia (*Rachycentron canadum*)	X	X	X	X
King Mackerel (*Scomberomorus cavalla*)	X	X	X	X
Spanish Mackerel (*S. maculatus*)	X	X	X	X
Red Drum Fishery				
Red Drum (*Sciaenops ocellatus*)	X	X	X	X
Reef Fish Fishery				
Gray Triggerfish (*Balistes capriscus*)	X	X	X	X
Red Snapper (*Lutjanus campechanus*)	X	X	X	X
Gray Snapper (*L. griseus*)	X	X	X	X
Lane Snapper (*L. synagris*)	X	X	X	X
Shrimp Fishery				
Brown Shrimp (*Farfantepenaeus aztecus*)	X	X	X	X
Pink Shrimp (F. *duorarum*)	X	X	X	X
White Shrimp (*Litopenaeus setiferus*)	X	X	X	X
Highly Migratory Species				
Atlantic Sharpnose Shark (*Rhizoprionodon terranovae*)	X	X	X	X
Blacknose Shark (*Carcharhinus acronotus*)			X	X
Blacktip Shark (*Carcharhinus limbatus*)	X	X	X	X
Bonnethead Shark (*Sphyrna tiburo*)	X	X	X	X
Bull Shark (*Carcharhinus leucas*)			X	X
Finetooth Shark (*Carcharhinus isodon*)	X	X	X	X
Great Hammerhead Shark (*Sphyrna mokarran*)	X	X	X	X
Scalloped Hammerhead Shark (*Sphyrna lewini*)	X	X	X	X
Spinner Shark (*Carcharhinus brevipinna*)			X	X
Tiger Shark (*Galeocerdo cuvier*)			X	

3.1 Species Accounts

Life history, preferred habitat, and occurrence in the Action Area of managed species with designated EFH are summarized below based on information from the Final Environmental Impact Statement (EIS) for the Generic EFH Amendment to several FMPs in the Gulf of Mexico (GMFMC 2004), the Generic Amendment Number 3 for Addressing EFH Requirements, HAPC, and Adverse Effects of Fishing in several FMPs of the Gulf of Mexico (GMFMC 2005), the Atlantic Highly Migratory Species Fishery Management Plan (NMFS 2006), and other literature.

3.1.1 Coastal Migratory Pelagic Fishery

Three coastal migratory pelagic FMP species occur within the Gulf of Mexico Management Unit: cobia (*Rachycentron canadum*), king mackerel (*Scomberomorus cavalla*), and Spanish mackerel (*S. maculatus*). EFH is identified within the entire Project Area (Figure 4). Cobia are found in coastal and offshore waters (from bays and inlets to the continental shelf) at depths of 3 to 230 feet (Benson 1982; GMFMC 2004). Spawning occurs in coastal waters from April through September. Eggs are found in the top few feet of the water column, drifting with the currents. Larvae typically are found in offshore waters of the northern Gulf of Mexico, likely feeding on zooplankton. Juveniles occur in coastal and offshore waters feeding on small fishes, squid, and shrimp. While cobia themselves rarely use estuarine environments such as Mississippi Sound, estuaries are important for most of their prey items. They are highly predaceous, feeding mainly on mantis shrimp, eels, crabs, squid, and Spanish mackerel (Benson 1982; GMFMC 2004). All life stages of cobia potentially occur in the Gulf portion of the Action Area (NMFS 2011; NOAA 2011).

Within the Gulf of Mexico, king mackerel distributions are centered in south Florida and Louisiana. Adults are found over reefs and in coastal waters, and they rarely enter estuaries. King mackerel migrate to the northern Gulf in the spring and are found in waters with temperatures greater than 68 °F. Adults generally occur at oceanic salinities ranging from 32 to 36 parts per thousand (ppt) and depths less than 263 feet, although they can be found at the shelf edge in depths to 656 feet (Benson 1982; GMFMC 2004). Adults feed primarily on fishes including jacks, snappers, grunts, and halfbeaks, as well as invertebrates such as penaeid shrimp, squid, and other crustaceans and mollusks. Adults spawn over the outer continental shelf from May to October; the northwestern and northeastern sectors of the Gulf of Mexico are considered important spawning areas. The pelagic eggs are found offshore over depths of 115 to 591 feet in spring and summer. Larvae occur over the middle and outer continental shelf, primarily in the north-central and northwestern Gulf, where they consume larval fishes, such as carangids, clupeids, and engraulids. Juveniles are found from inshore to the middle shelf, where they feed on engraulid and clupeid fishes and some squid. Nursery areas are located in marine waters with juveniles only occasionally entering estuaries (GMFMC 2004). While estuaries are important for the variety of prey species king mackerel feed upon, including squid, shrimp, and other crustaceans, king mackerel mainly feed on herring (Benson 1982; GMFMC 2004). Adult and juvenile king mackerel are found in the estuarine and Gulf portions of the Action Area (NOAA 2011).

Spanish mackerel distribution in the Gulf of Mexico is centered off the Florida coast. Adults are found in inshore coastal waters and may enter estuaries in pursuit of baitfish. Similar to king mackerel, Spanish mackerel migrate to the northern Gulf in the spring and are found down to depths of 246 feet at oceanic salinities. Adults feed mostly on fishes, and less often on crustaceans and mollusks with a diet that includes clupeids, engraulids, carangids, and squid (Benson 1982; Pattillo et al. 1997). Adults spawn over the inner continental shelf from May to September; the north-central and northeastern sectors of the Gulf of Mexico are considered important spawning areas. The pelagic eggs are found over the inner continental shelf at depths less than 164 feet in spring and summer. Larvae occur over the inner continental shelf, principally in the northern Gulf, where they consume larval fishes, such as carangids, clupeids, and engraulids. Juveniles occur in estuarine and coastal waters (e.g., Action Area), where they feed on engraulid and clupeid fishes, gastropods, and some squid. Juveniles are relatively common in Mississippi Sound from spring through fall. Estuaries including the Action Area also are important for most Spanish mackerel prey items.

3.1.2 Red Drum Fishery

Red drum (*Sciaenops ocellatus*) occur throughout the Gulf of Mexico in a variety of habitats, ranging from very shallow estuarine waters to depths of approximately 130 feet offshore. EFH is identified within the entire proposed Project area (Figure 4). They commonly occur in almost all of the Gulf estuaries over a variety of substrates including seagrass, sand, mud, and oyster reefs. Spawning occurs from September through November in deeper water near the mouths of bays and inlets, and on the Gulf side of the barrier islands (GMFMC 2004). The eggs hatch mainly in the Gulf, and larvae are transported into the estuary on tides and currents (GMFMC 2004). Larvae remain in shallow areas among submerged sea grasses until strong enough to swim on their own (NMFS 1986). Peak immigration of larvae into coastal waters varies annually, but the peak occurred in either September or October each year (NMFS 1986). Estuarine wetlands are important to larval, juvenile, and sub-adult red drum (GMFMC 2004). Adult red drum use estuaries, but tend to spend more time offshore as they age.

Crustaceans and fishes are most important in the diet of red drum; primary food items are blue crabs, striped mullet, spot, pinfish, and pigfish (GMFMC 2004). In Mississippi Sound, juveniles are relatively common year-round and adults are relatively common from February to October.

3.1.3 Shrimp Fishery

Three commercially important species of shrimp are found in Mississippi coastal waters: brown shrimp (*Farfantepenaeus aztecus*), pink shrimp (*F. duorarum*), and white shrimp (*Litopenaeus setiferus*; Figure 4). All three species spawn in offshore waters of the Gulf of Mexico, producing demersal eggs, which hatch into pelagic larvae. Larvae of shrimp feed on phytoplankton and zooplankton. Post-larvae of all three species migrate to estuaries where they become benthic and feed on epiphytes, phytoplankton, and detritus (GMFMC 2004). As juveniles grow, they tend to move to deeper habitats within the estuaries, and as they approach maturity they emigrate from estuaries to offshore habitats to spawn and repeat the cycle. Juveniles and adults prey on polychaetes, amphipods and chironomid larvae, but also detritus and algae. Much of the findings in the literature suggest that shrimp yields in the Gulf of Mexico are dependent on estuarine marshes and grasses that offer food and protection from predators, as well as, an essential salinity gradient (GMFMC 2004).

There are seasonal variations in the spawning times of pink, brown, and white shrimp. Brown shrimp post-larvae enter Mississippi Sound in large numbers mainly from February through April, with a smaller wave of migration in the fall. White and pink shrimp post-larvae arrive during the summer and fall, with white shrimp post-larvae being more abundant. Brown shrimp inhabit offshore waters ranging from 45 to 360 feet in depth. Mature pink shrimp inhabit deep offshore waters, and the highest concentrations occur in depths of 33 to 145 feet. White shrimp adults are typically found in nearshore waters rarely exceeding 90 feet in depth and generally become most abundant at approximately 45 feet in depth (GMFMC 2004).

Brown shrimp are most abundant from June to October and can be found in Mississippi Sound inshore and offshore waters associated with silt, muddy sand, and sandy substrates. White shrimp are found in shallower waters of the Sound over mud bottoms. Pink shrimp are usually found in higher salinity water in the Sound and are most abundant in winter and early spring.

3.1.4 Reef Fishery

The reef fish FMP applies to 42 species of fish in the snapper, grouper, tilefishes, jacks, triggerfish, wrasse, and sand perch families. Four of these may occur in the proposed Project area (Figure 4). Generally, reef fish are widely distributed in the Gulf of Mexico in both pelagic and benthic habitats, depending on life cycle.

Gray triggerfish (*Balistes capriscus*) are found throughout the Gulf of Mexico. Eggs occur in late spring and summer in nests built in sand near natural and artificial reefs (GMFMC 2004). Larvae and post-larvae occur in the upper water column, usually associated with *Sargassum* and other flotsam. Early and late juveniles also are associated with *Sargassum* and other flotsam, and may be found in mangrove estuaries. Juveniles (5 to 7 inches) leave the surface habitat in the fall and move to reef habitat. Adults are found offshore in waters deeper than 33 feet where they are associated with natural and artificial reefs. Triggerfish may move away from the reef structure to feed. Spawning adults occur in late spring and summer around natural and artificial reefs in water depths greater than 33 feet.

Red snapper (*Lutjanus campechanus*) occur throughout the Gulf of Mexico shelf. They are particularly abundant on the Campeche Banks (off Mexico) and in the northern Gulf. Red snapper are demersal and typically found over sandy and rocky bottoms, around reefs, and around underwater objects from shallow water to depths up to 656 feet. Adults are concentrated off Yucatan, Texas, and Louisiana and favor deeper water (23 to 479 feet). Spawning occurs in offshore waters from May to October at depths of 59 to 121 feet over fine sand away from reefs. Eggs are found offshore in summer and fall. Larvae, post-larvae, and early juveniles are found from July through November in waters ranging in depth from 55 to 600 feet. Early and late juveniles are often associated with structures, objects, or small burrows, but also are abundant over barren sand and mud bottoms. Late juveniles are taken year-round at depths of 65 to 130 feet. Within the Action Area, red snapper use the Gulf as a nursery area year-round (NOAA 2011).

Gray snapper (*L. griseus*) occur in estuaries and shelf waters of the Gulf and are particularly abundant off of south and southwest Florida (GMFMC 2004). Considered to be one of the more abundant snappers inshore, gray snapper inhabit waters to depths of approximately 590 feet. Adults are demersal and mid-water dwellers, occurring in marine, estuarine, and riverine habitats. They occur up to 20 miles offshore and inshore as far as coastal plain freshwater creeks and rivers. They are found among mangroves, sandy seagrass beds, and coral reefs, and over sandy, muddy, and rocky bottoms. Spawning occurs offshore around reefs and shoals from June to August. Eggs are pelagic, and are present from June through September after the summer spawn, occurring in offshore shelf waters and near coral reefs. Larvae are planktonic, occurring in peak abundance from June through August in offshore shelf waters and near coral reefs from Florida through Texas. Post-larvae move into estuarine habitat and are found especially over dense grass beds. Juveniles are often found in estuaries, channels, bayous, ponds, seagrass beds, marshes, mangrove swamps, and freshwater creeks (Nelson, D.M., et al. 1991, Pattillo et al. 1997). They appear to prefer *Thalassia* seagrass flats, marl bottoms, and mangrove roots. Juveniles use the estuarine bays as nursery grounds from May through September.

Lane snapper (*L. synagris*) occur throughout the shelf area of the Gulf in depths ranging from 0 to 427 feet. This species is demersal and will occur over all bottom types, but is most common in coral reef and sandy bottoms. Adults occur offshore at water depths of 13 to 433 feet on sand bottom, natural channels, banks, and man-made reefs and structures. Spawning occurs offshore from March through September. Nursery areas include mangrove and grassy estuarine areas in southern Texas and Florida as well as shallow areas with sandy and muddy bottoms off all Gulf of Mexico states (e.g., Mississippi Sound). Early and late juveniles favor seagrass flats, reefs, and soft-bottom areas to offshore depths of 66 feet (GMFMC 2004).

3.1.5 Highly Migratory Species

Mississippi Sound and adjacent waters have been identified as EFH for ten sharks, primarily Atlantic sharpnose (*Rhizoprionodon terranovae*), blacktip (*Carcharhinus limbatus*), finetooth (*C. isodon*), and bull sharks (*C. leucas*; Figures 5 and 6). Other less common species are spinner (*C. brevipinna*), blacknose (*C. acronotus*), bonnethead (*S. phyrna tiburo*), great hammerhead (*S. mokarran*), scalloped hammerhead (*S. lewini*), and tiger sharks (*Galeocerdo cuvier*; Figure 5; Figures 7 through 12).

Typically sharks migrate inshore in the early spring around March and April, remain inshore during the summer months, and then migrate offshore around October. Most shark species in Mississippi coastal waters give birth during late spring and early summer, with young sharks spending just a few months of their lives in shallow coastal waters.

Most shark species are abundant around Mississippi and Alabama barrier islands, with adult sharks commonly located south of the barrier islands. Younger sharks, which can tolerate lower salinities, have been found as far inshore as Round and Deer islands. Large numbers of young-of-the-year (YOY) blacktip sharks were collected in the lower reaches of Mobile Bay, Fort Morgan, Sand Island, north of Horn Island, and near the mouth of Bay St. Louis with high catch rates in May through July (NMFS 2009). Immature bull sharks also have been found in Mississippi Sound and Mobile Bay off the coasts of Mississippi and Alabama (NMFS 2009).

The four most common inshore shark species (Atlantic sharpnose, blacktip, finetooth, and bull sharks) feed primarily on fish, including menhaden, spot, croaker, speckled trout, and hardhead catfish. In addition, researchers have found crabs in the stomachs of bonnethead sharks and stingrays and smaller sharks in the stomachs of blacktip and bull sharks.

Atlantic sharpnose sharks occur in a variety of coastal habitats in the Gulf of Mexico. YOY and juveniles have been found at temperatures of 71.2 to 89.1°F, salinities of 29.0 to 37.2 ppt, and DO concentrations of 2.7 to 6.9 mg/L. YOY were associated with mud, sand, and seagrass beds, and juveniles were associated with sand, seagrass, and mud, in descending order of dominance (NMFS 2009).

Blacktip sharks typically are found in shallow coastal waters and offshore surface waters of the continental shelves. Young are born in late May and early June in shallow coastal nurseries in bay systems of the Gulf of Mexico. YOY and juvenile blacktip sharks have been collected in Mississippi Sound and Mobile Bay in water between 10.2 and 26.9 feet mean depth, 80.1 and 87.1°F mean temperature, 18 to 20 ppt mean salinity, and 5.5 and 7.3 mg/L DO (NMFS 2009).

Finetooth sharks are abundant along the southeastern United States and the Gulf of Mexico, with adult, neonate, and juveniles collected in bays off the coast of Louisiana most frequently in mid to late summer (NMFS 2009). Both adult and juvenile finetooth sharks have been captured in Mississippi Sound north of Cat, Ship, Horn, and Petit Bois islands (NMFS 2009).

Bull sharks are large, shallow-water sharks found in warm seas and estuaries and often enter freshwater. The primary nurseries typically are in lower salinity estuaries and river mouths. YOY stay in these nurseries as late as November, when water temperatures reach 69.8°F (NMFS 2009). Immature bull sharks have been found in Mississippi Sound at salinities of 14 to 17.1 ppt (NMFS 2009).

4 POTENTIAL ADVERSE EFFECTS OF PROPOSED PROJECT

The proposed Project is located within an area designated as EFH for six FMPs as described in Section 3. The proposed Project may affect EFH for these fisheries through direct habitat loss, reductions in prey, water quality changes, and increased noise during construction. These possible effects on each EFH fishery are discussed below.

4.1 Effects on Coastal Migratory Pelagic Fishery

EFH for all life stages of the coastal pelagic fishery is present in the Action Area. Potential direct effects include the permanent conversion of 87.6 acres of submerged estuarine nearshore habitat from channel widening (100 feet by 7.2 miles) and deepening (9 to 13 feet to the federally authorized -42 feet MLLW). This estuarine nearshore habitat is composed of clay, silt, and sand bottom and is utilized by coastal pelagics at some, if not all life stages. There also will be a potential loss of 87.6 acres of benthic prey and prey production; however, these effects are likely temporary and prey resources are expected to recover quickly at shallower depths (9 months) and more slowly at greater depths (up to 2 years) (Bolam et al. 2010; Bolam and Rees 2003; Newell et al. 1998; Sheridan 1999). Over time, the converted area of habitat is expected to recover its function. The substrates will return to the same clay, silt, and sand bottom and benthic organisms will recolonize the area. Disturbance to these areas will not be significant to EFH as a whole given that widening would make up approximately 0.001 square mile of the total 1,850 square miles of Mississippi Sound and is not anticipated to impact the overall coastal processes or water quality in the Sound.

The channel is anticipated to need maintenance dredging every three years (Atkins North America 2012). This recurring disturbance may limit the recovery of the converted habitat. However, the USACE is evaluating whether to assume maintenance of the completed proposed Project under a Section 204(f) study, and the impacts to EFH from maintenance of the channel will be addressed in that document.

There also will be temporary effects to prey and prey production caused by the placement of dredge materials in the LZA and Pascagoula ODMDS. This area is within the designated EFH for the coastal pelagic fishery; however these effects are temporary and prey resources are expected to recover in approximately 6 months (Bolam and Rees 2003; Bolam et al. 2010, Wilber, D.H. et al. 2007; USACE 1999). This also is a dynamic area with frequent storms depositing and eroding substrates. Placement of dredged materials will incorporate one or a combination of minimization measures detailed in Section 5, the ESA BA (Anchor QEA 2012b), and in the DMMP (Anchor QEA 2012a). Materials placed into the ODMDS meet the USEPA criteria for placement, based on the sediment chemistry and elutriate test results (Anchor QEA 2012). Effects from disposal of dredged material are anticipated to be insignificant.

Long-term beneficial effects to EFH from placement of dredged materials in the LZA may occur. The strategic placement of dredged materials in the LZA will contribute to the maintenance of the barrier islands. The north side of the barrier islands contains the majority of the seagrasses found in the proposed Project vicinity (See Figure 3).

Effects to the coastal pelagic EFH may include water quality changes including temperature, salinity, DO, and turbidity. The barrier islands serve as a boundary between the sea water salinity of the open Gulf of Mexico and the brackish water of Mississippi Sound. The proposed Project would widen the existing Bayou Casotte and Lower Pascagoula Sound Channel from 350 to 450 feet and increase the channel size by approximately 30 percent. Increased channel size may marginally change the rate of water exchange, potentially altering the salinity in Mississippi Sound locally. However, effects are expected to be insignificant given that the proposed Project encompasses less than one percent of the available area in Mississippi Sound.

Permanent effects on water temperature may occur in the new channel that will be created by the widening based on the correlation between water depth and temperature. Temporary and minor effects on temperature profiles, due to water column mixing, are expected during the dredging operations and for a short period of time after dredging operations have been completed. Temperature variants once dredging is complete will be the same as those within the previously dredged channel area.

The proposed widening of the channel may slightly increase the volume of denser saltwater entering Bayou Casotte from the Gulf and alter salinities (Atkins North America 2012). Deepening and widening the Bayou Casotte channel may alter the degree and form of estuarine mixing. Waters in this portion of Mississippi Sound are stratified, with lower density freshwater on top of higher density saline waters. This vertical stratification is important to local biota and should be maintained with the proposed Project; therefore, no adverse effects in the freshwater-saltwater mixing zone in this stratified system are anticipated.

Reductions in localized DO may occur during dredging, as mixing of water with bottom sediments may result in increased chemical and biological oxygen demand. In addition, widening the existing navigation channel by 100 feet will marginally increase the volume of the existing density current and increase the area of deeper depths within Mississippi Sound. This could lead to localized hypoxia in the new deeper depths. However, this change is expected to be insignificant to EFH given that the proposed Project composes less than one percent of EFH in Mississippi Sound.

Effects on turbidity due to the proposed Project are anticipated to be temporary and would be restricted to periods of dredging operations. The use of appropriate turbidity control measures for the proposed Project will help reduce turbidity from the proposed Project within the Action Area. Widening the channel to the depth of the existing channel is not expected to permanently impact turbidity in the adjacent sound area. In general, Mississippi Sound naturally exhibits high turbidity due to freshwater inputs, tannins, tides, and currents. The amount and extent of resuspension is a byproduct of several factors, including physical properties of the sediment, site conditions, nature and extent of debris and obstructions, and operational considerations of the dredge equipment and operator. Sediment plume sizes typically decrease exponentially with movement away from the dredging and placement sites both vertically and horizontally, as well as, with time due to movement of suspended material with tides and currents (Bridges et al. 2008).

Relocating channel markers and range structures will require impact pile driving. Underwater noise during impact pile driving will temporarily reduce the quality of EFH in the immediate vicinity of the pile driving; however, temporary increases in noise levels due to impact pile driving are not anticipated to reach interim fish injury thresholds currently accepted by the NMFS (FHWA 2012). Noise levels will be below thresholds because wood piles are proposed and will be driven into the soft to very soft clay substrates that would absorb and not reflect most of the sound energy. Additional discussion on noise impacts is included in the ESA BA (Anchor QEA 2012b).

The lifting of nighttime travel restrictions will change temporal conditions for EFH in the Action Area because there will now be vessel travel in the Action Area during that period. However, boats and vessels currently traverse the Sound and Gulf during nighttime hours, and the size and traffic volume for vessels calling on the Port will not change. Increased prop scour occurring during low tide events may have some minor impacts on the benthic community in the navigation channel; however, such disturbances are anticipated to be rare due to the depth of the channel.

4.2 Effects on Red Drum Fishery

Potential effects to the Red Drum Fishery are expected to be the same as those for the Coastal Migratory Pelagic Fishery (Section 4.1).

4.3 Effects on Shrimp Fishery

Potential effects to the Shrimp Fishery are expected to be the same as those for the Coastal Migratory Pelagic Fishery (Section 4.1).

4.4 Effects on Reef Fish Fishery

Potential effects to the Reef Fish Fishery are expected to be the same as those for the Coastal Migratory Pelagic Fishery (Section 4.1).

4.5 Effects on Highly Migratory Species

Potential effects to the Highly Migratory Species are expected to be the same as those for the Coastal Migratory Pelagic Fishery (Section 4.1).

5 PROPOSED MINIMIZATION MEASURES

Measures to minimize effects to EFH should include the following:

- Avoid sensitive habitats such as seagrass or submerged aquatic vegetation (SAV)
- Monitor water quality during dredging

Additional measures to minimize impacts to habitat are discussed in the ESA BA (Anchor QEA 2012b).

6 CONCLUSION AND EFFECT DETERMINATION

The proposed Project may adversely affect the following fisheries due to a potential reduction in the quantity and quality of EFH in the Mississippi Sound:

- Coastal Pelagic Fishery
- Red Drum Fishery
- Reef Fish Fishery
- Shrimp Fishery
- Highly Migratory species

This proposed Project may adversely affect EFH for the following reasons:

- Approximately 87 acres of silt, clay, and sand bottom EFH would be permanently altered, and the deep portions of this newly dredged area are expected to exhibit the same anoxic conditions during warmer seasons as the existing dredged area currently experiences.

However, most effects of the proposed Project are temporary or insignificant to EFH. These include the following:

- Temporary adverse effects to EFH quality include water temperature changes, turbidity increases, underwater noise increases, and prey loss at the LZA and ODMDS sites. However, these effects are expected to be short-term and are anticipated to return to baseline levels at some point following proposed Project completion.
- Effects on EFH from new night operations may occur, but are expected to be minimal, as vessel traffic currently traverses nearby areas. The proposed Project is not expected to increase overall vessel traffic volumes or increase vessel sizes using the channels or harbor.
- Any increased prop scour and its accompanying turbidity is anticipated to be minor and rare due to the depth of the channel.

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TABLES

Table 4
Species Life Stage Habitat Requirements

Fishery	Species	Egg	Larvae	0	Juvenile	Adult	Comments
Coastal Migratory Pelagic	Cobia (*Rachycentron canadum*)	0- to 1-meter depth; nearshore pelagic	11- to 53-meter depth; nearshore and offshore pelagic		5- to 300-meter depth; nearshore and offshore pelagic	1- to 70-meter depth; nearshore and offshore pelagic; spawning occurs April to September in water 23 to 28°C	
	King Mackerel (*Scomberomorus cavalla*)	35- to 180-meter depth; utilizes offshore pelagic areas	35- to 180-meter depth; utilize offshore and nearshore pelagic areas		<9-meter depth; utilizes offshore and nearshore pelagic areas	<80-meter depth; utilizes offshore and nearshore pelagic areas	Prefer temperatures >20°C and salinities 32 to 36 ppt
	Spanish Mackerel (*S. maculatus*)	0- to 50-meter depth; utilize nearshore pelagic areas	<50-meter depth; nearshore pelagic		<50-meter depth; estuarine and nearshore pelagic	3- to 75-meter depth; estuarine and nearshore pelagic	Prefer temperatures >20°C
Red Drum	Red Drum (*Sciaenops ocellatus*)	Nearshore pelagic areas	Found in estuarine SAV, soft bottoms, sand/shell, and emergent marshes		0- to 5-meter depth; estuarine SAV, soft bottoms, emergent marshes, and nearshore sand/shell and hard bottoms	1- to 70-meter depth; utilizes estuarine SAV, soft bottoms, sand/shell and emergent marshes; nearshore and offshore pelagic, sand/shell, and hard bottoms; spawning occurs near bays and inlets and on the Gulf side of barrier islands	Can tolerate wide range of salinities
Reef	Gray Triggerfish (*Balistes capriscus*)	10- to 100-meter depth; nearshore and offshore reefs	Surface; nearshore with drift algae		10- to 100-meter depth; nearshore reefs, drift algae, and mangroves	10- to 100-meter depth; found on nearshore and offshore reefs, sand/shell bottom; spawning occurs in late spring and summer	
	Red Snapper (*Lutjanus campechanus*)	18- to 37-meter depth; utilizes offshore pelagic areas	18- to 37-meter depth; utilizes nearshore and offshore pelagic areas		17- to 183-meter depth; utilizes nearshore and offshore hardbottom, sand/shell, and softbottom areas	7- to 146-meter depth; utilizes offshore hardbottom and reef areas; spawns May to October	
	Gray Snapper (*L. griseus*)	0- to 180-meter depth; utilizes nearshore and offshore reefs	0- to 180-meter depth; utilizes estuarine and nearshore SAV, emergent marshes, and mangroves		0- to 180-meter depth; utilizes nearshore and offshore sand/shell, hardbottom, reefs, and soft bottom areas	0- to 180-meter depth; utilizes estuarine emergent marshes, sand/shell, and soft bottoms; nearshore and offshore sand/shell, soft bottoms, reefs and hardbottoms; spawns June to August	
	Lane Snapper (*L. synagris*)	4- to 132-meter depth; utilizes offshore pelagic zone	4- to 132-meter depth; utilize estuarine and nearshore SAV, sand, soft bottom, and mangrove areas		0- to 20-meter depth; utilizes nearshore sand/shell and reef areas and offshore shoals/banks, reefs, and sand shell areas	4- to 132-meter depth; utilizes nearshore and offshore sand/shell, reefs, and shoals/banks; spawns March to September with peak July to August	
Shrimp	Brown Shrimp (*Penaeus aztecus*)	18- to 110-meter depth; offshore sand/shell and soft bottoms	0- to 82-meter depth; estuarine emergent marshes, SAV, sand shell, soft bottoms, and oyster reefs		0- to 18-meter depth; same as larval stage; prefer >25 ppt salinity	14- to 110-meter depth; nearshore and offshore sand/shell and soft bottoms; spawning occurs in spring in summer in water temps 17 to 29°C	
	Pink Shrimp (*P. duorarum*)	9- to 48-meter depth; nearshore and offshore sand/shell	1- to 50-meter depth; nearshore sand/shell, SAV and pelagic; offshore pelagic		1- to 65-meter depth; nearshore sand/shell and SAV	1- to 110-meter depth; nearshore sand/shell; spawn spring to fall at temperatures of 19.6 to 30.6°C	
	White Shrimp (*P. setiferus*)	9- to 34-meter depth; nearshore sand/shell and soft bottoms	1- to 82-meter depth; nearshore pelagic		0- to 18-meter depth; estuarine emergent marshes, soft bottoms	9- to 34-meter depth; nearshore soft bottoms; spawn spring to fall at temperatures of 20 to 28°C and salinities of 26 to 34 ppt	

Table 4
Species Life Stage Habitat Requirements

Fishery	Species	Egg	Larvae	0	Juvenile	Adult	Comments
Highly Migratory	Atlantic Sharpnose Shark (*Rhizoprionodon terranovae*)			Utilize mud, sand, and seagrass bottoms	Utilize mud, sand, and seagrass bottoms		Found year-round in the Gulf
	Blacknose Shark (*Carcharhinus acronotus*)						Uncommon in shallow waters in Gulf
	Blacktip Shark (*Carcharhinus limbatus*)				Found in Mississippi Sound and Mobile Bay in 27.1 to 30.6°C and 18 to 20 ppt salinities		Young are born in late May-early June
	Bonnethead Shark (*Sphyrna tiburo*)			Found in shallow coastal water with sand and soft bottoms	Found in shallow coastal water with sand and soft bottoms	Found in shallow coastal water with sand and soft bottoms	
	Bull Shark (*Carcharhinus leucas*)				Found in Mississippi Sound and Mobile Bay at salinities of 14 to 17.1 ppt		
	Finetooth Shark (*Carcharhinus isodon*)			Abundant in eastern portion of Mississippi Sound in June and July; found at depths of 3.1 to 8.2 meters, 18 to 20 ppt salinity, and 27.1 to 30.6°C			
	Great Hammerhead Shark (*Sphyrna mokarran*)						Found mainly off the west coast of Florida and scattered in the Gulf from Alabama to Texas
	Scalloped Hammerhead Shark (*Sphyrna lewini*)			Found in coastal areas in Gulf; temperatures range from 23.2-30.2°C and salinities of 27.6-30.3 ppt	Found in coastal areas in Gulf	Found in coastal areas in Gulf	Nursery habitat off of coast of Mississippi
	Spinner Shark (*Carcharhinus brevipinna*)				Found in coastal waters of Mississippi during summer months		Ranges <30 meters to 150 meters deep
	Tiger Shark (*Galeocerdo cuvier*)			Found in water depths 20-50m in July and August in Northern Gulf			Nursery areas in northern Gulf have not been identified

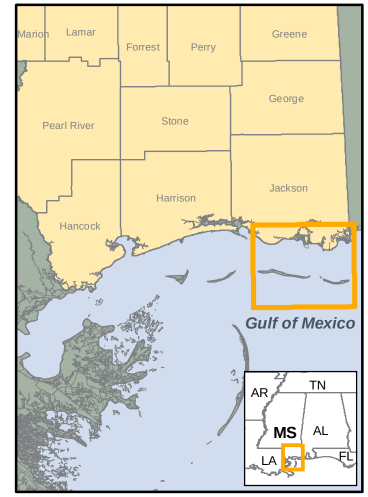
Notes:

ppt = parts per thousand

SAV = submerged aquatic vegetation

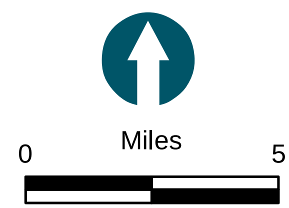
FIGURES

G:\Jobs\110616-01_BayouCasotteChannel_Permit\Maps\2012_03\EFH_Assessment\Figure1_Location.mxd broth 3/12/2012 3:06:30 PM



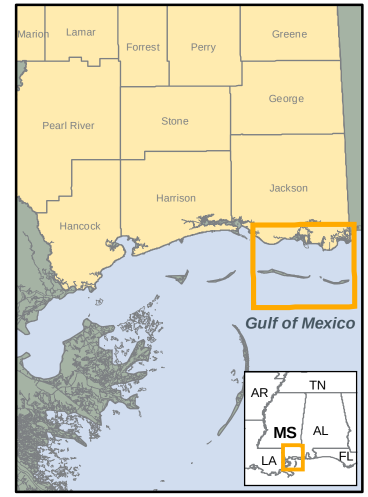
NOTES:

1. Base Map Imagery: Microsoft Bing Maps © 2010.



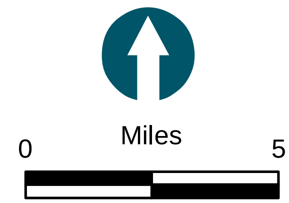
ANCHOR QEA

Figure 1
Project Location and Placement Sites
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project



NOTES:

1. Seagrass Data Source: http://www.ncddc.noaa.gov/
2. Base Map Imagery: Microsoft Bing Maps © 2010.



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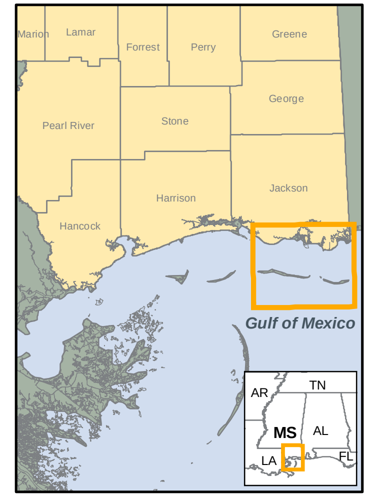
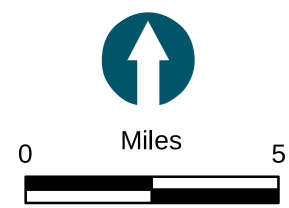
ANCHOR QEA

Figure 2
Action Area Boundary
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project

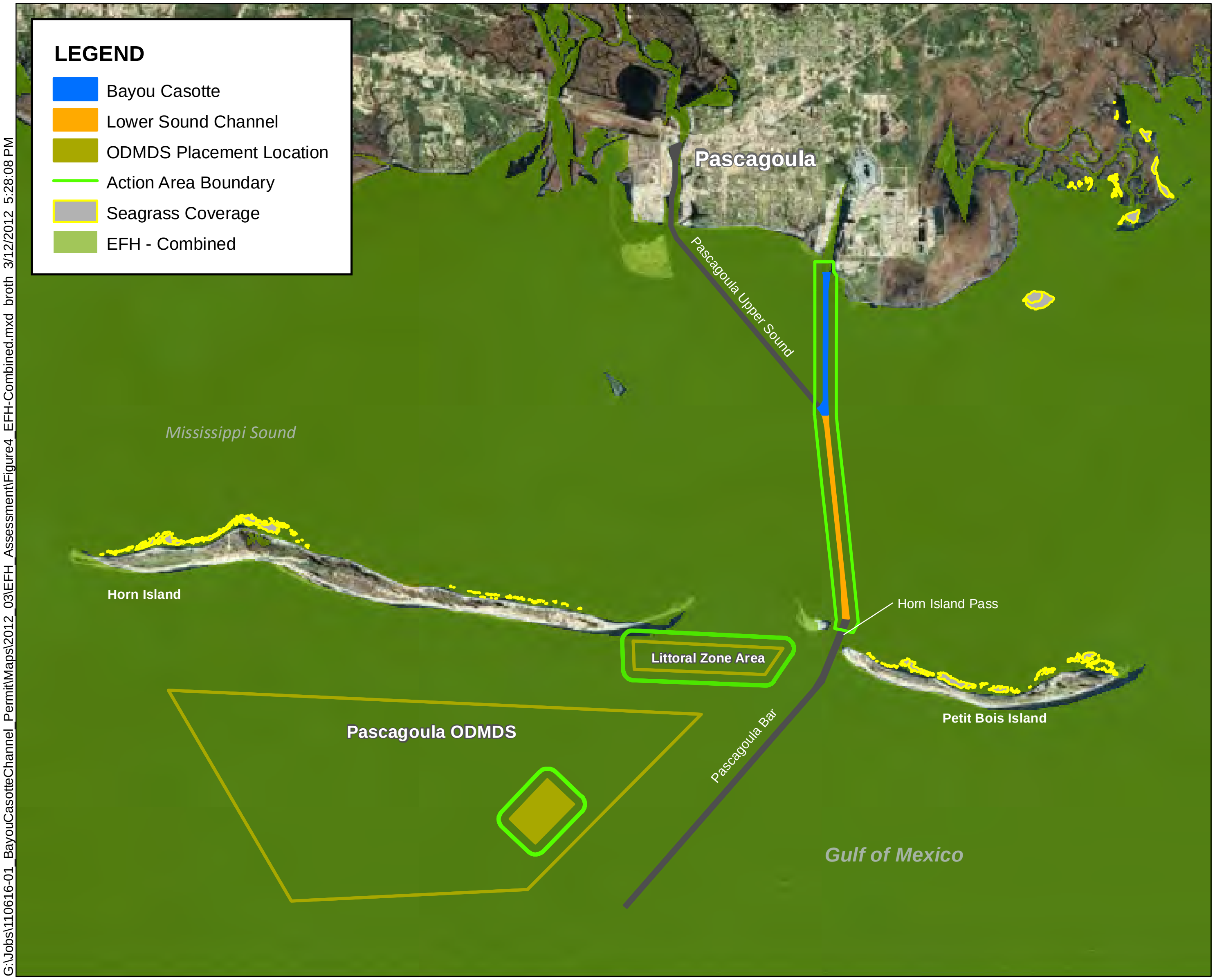


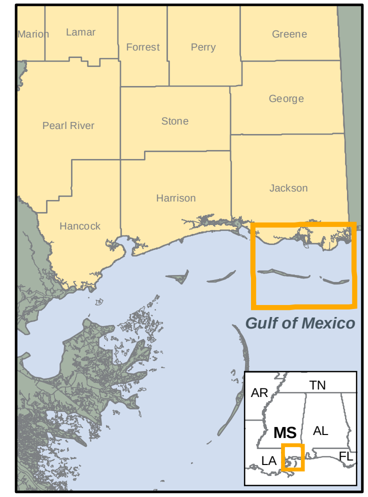
NOTES:
1. Seagrass Data Source: http://www.ncddc.noaa.gov/
2. Base Map Imagery: Microsoft Bing Maps © 2010.



ANCHOR QEA

Figure 3
Seagrass Cover
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project





NOTES:

1. Seagrass Data Source:
   http://www.ncddc.noaa.gov/
2. EFH Data Source:
   http://www.habitat.noaa.gov/
3. Combined EFH includes:
   - Coastal migratory pelagics
   - Red drum
   - Reef fish
   - Shrimp
4. Base Map Imagery: Microsoft Bing Maps © 2010.

Miles
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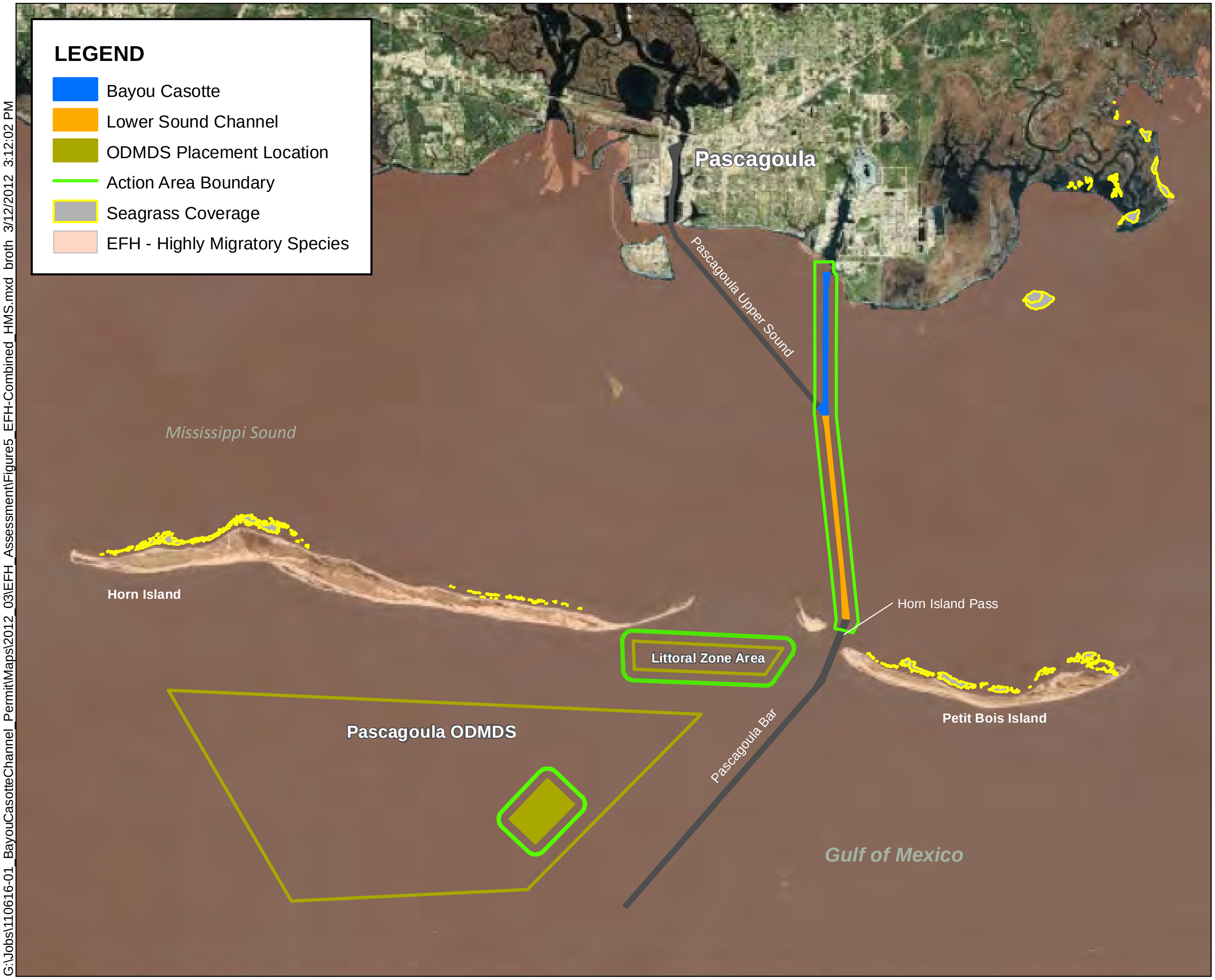
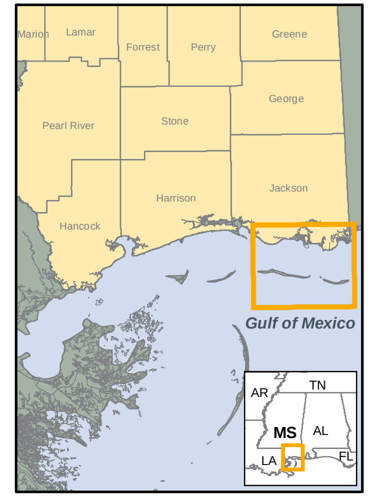
Figure 4

Combined Essential Fish Habitat – Coastal Migratory Pelagics, Red Drum, Reef Fish, and Shrimp
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project





NOTES:

1. Seagrass Data Source:
   http://www.ncddc.noaa.gov/
2. EFH Data Source:
   http://www.nmfs.noaa.gov/
3. Combined EFH includes:
   Atlantic sharpnose shark
   - All life stages

   Blacktip shark
   - All life stages

   Bull shark
   - Juvenile

   Finetooth shark
   - Neonate

   Great hammerhead shark
   - All life stages

   Spinner shark
   - Juvenile
4. Base Map Imagery: Microsoft Bing
   Maps © 2010.

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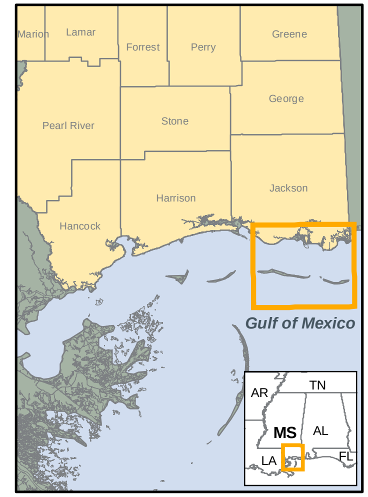
Figure 5

Essential Fish Habitat – Highly Migratory Species (Atlantic Sharpnose Shark, Blacktip Shark, Bull Shark, Finetooth Shark [neonate], Great Hammerhead Shark, and Spinner Shark)
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project



NOTES:

1. Seagrass Data Source: http://www.ncddc.noaa.gov/
2. EFH Data Source: http://www.nmfs.noaa.gov/
3. Base Map Imagery: Microsoft Bing Maps © 2010.

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ANCHOR QEA

Figure 6
Essential Fish Habitat – Finetooth Shark (Adult and Juvenile)
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project

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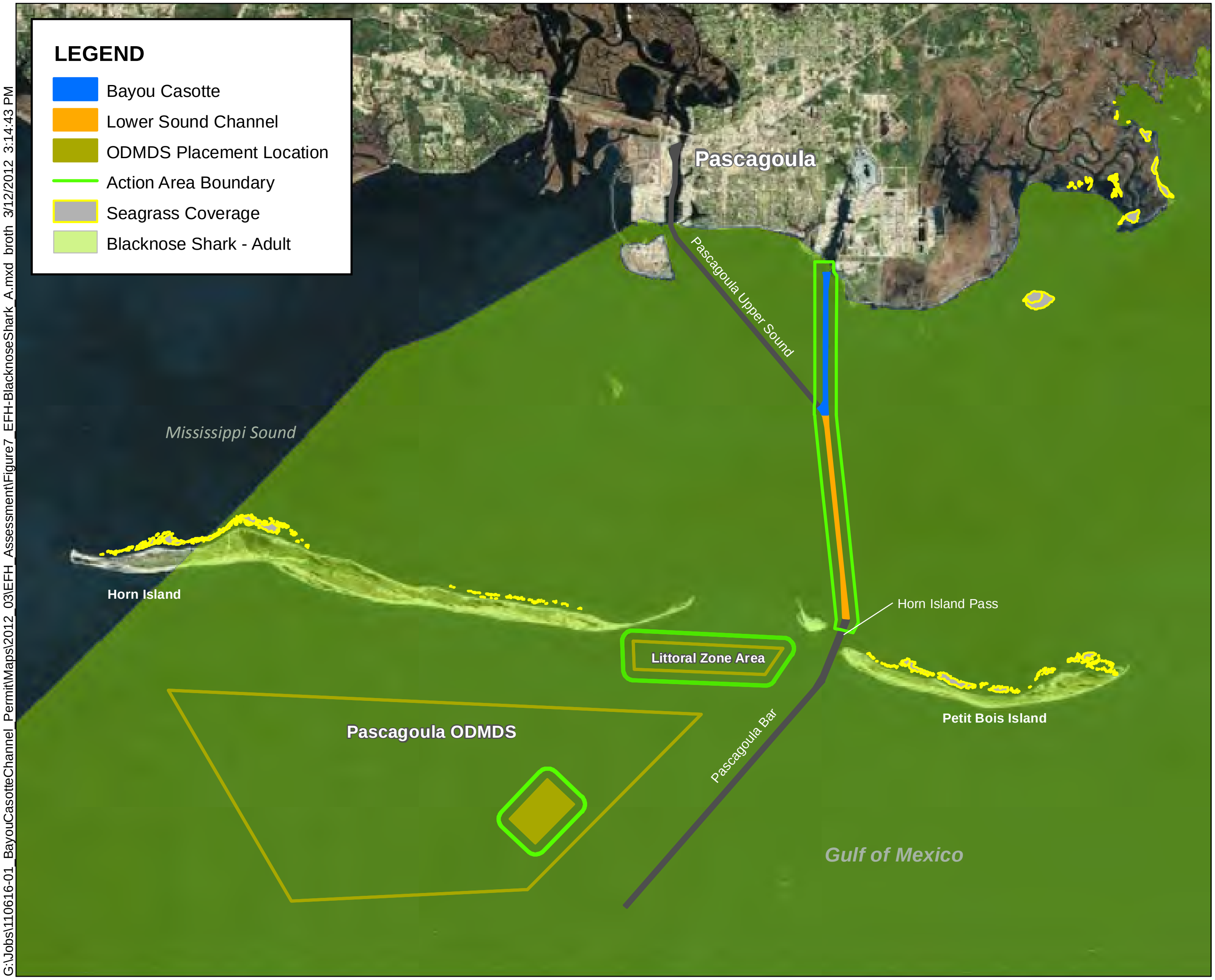

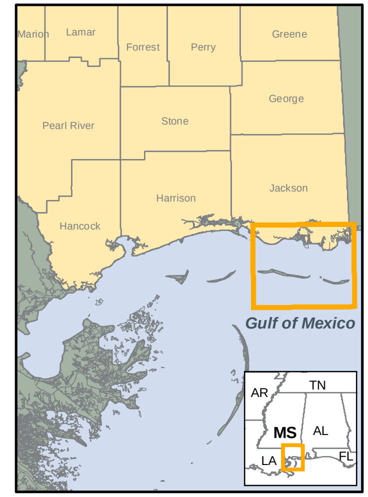

NOTES:

1. Seagrass Data Source:
   http://www.ncddc.noaa.gov/
2. EFH Data Source:
   http://www.nmfs.noaa.gov/
3. Base Map Imagery: Microsoft Bing Maps © 2010.

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Figure 7

Essential Fish Habitat – Blacknose Shark (Adult)

Essential Fish Habitat Assessment

Bayou Casotte and Lower Pascagoula Sound Channel Widening Project

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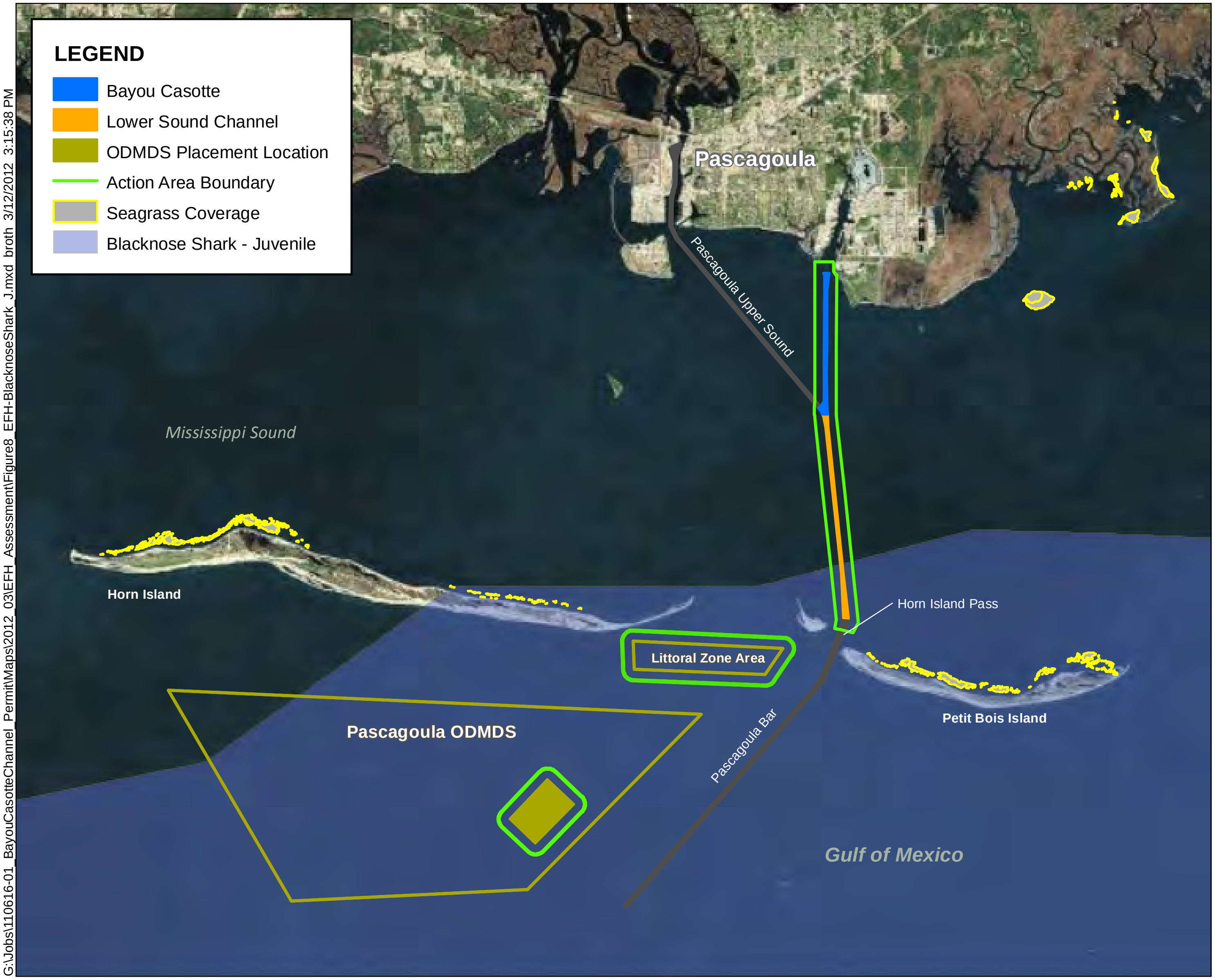

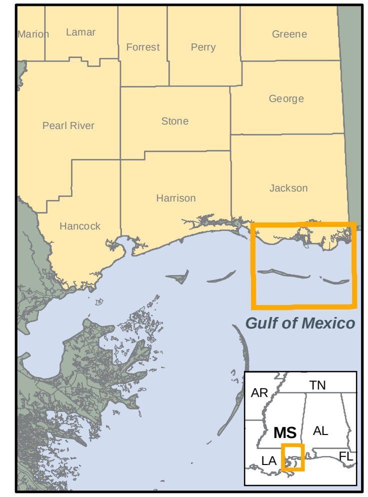

NOTES:

1. Seagrass Data Source: http://www.ncddc.noaa.gov/
2. EFH Data Source: http://www.nmfs.noaa.gov/
3. Base Map Imagery: Microsoft Bing Maps © 2010.

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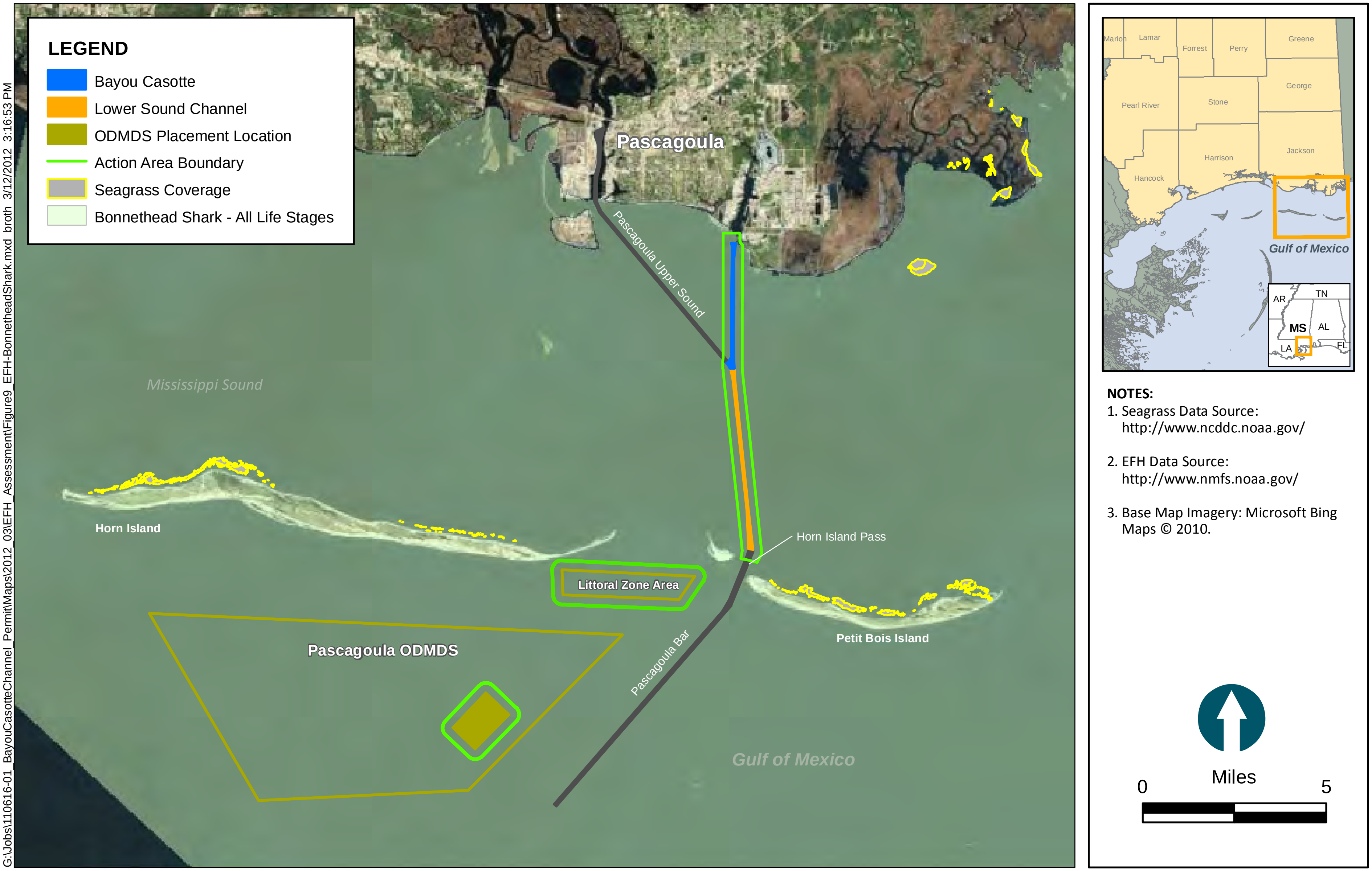
Figure 8
Essential Fish Habitat – Blacknose Shark (Juvenile)
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project



G:\Jobs\110616-01_BayouCasotteChannel_Permit\Maps\2012_03\EFH_Assessment\Figure9_EFH-BonnetheadShark.mxd broth 3/12/2012 3:16:53 PM

NOTES:

1. Seagrass Data Source: http://www.ncddc.noaa.gov/
2. EFH Data Source: http://www.nmfs.noaa.gov/
3. Base Map Imagery: Microsoft Bing Maps © 2010.

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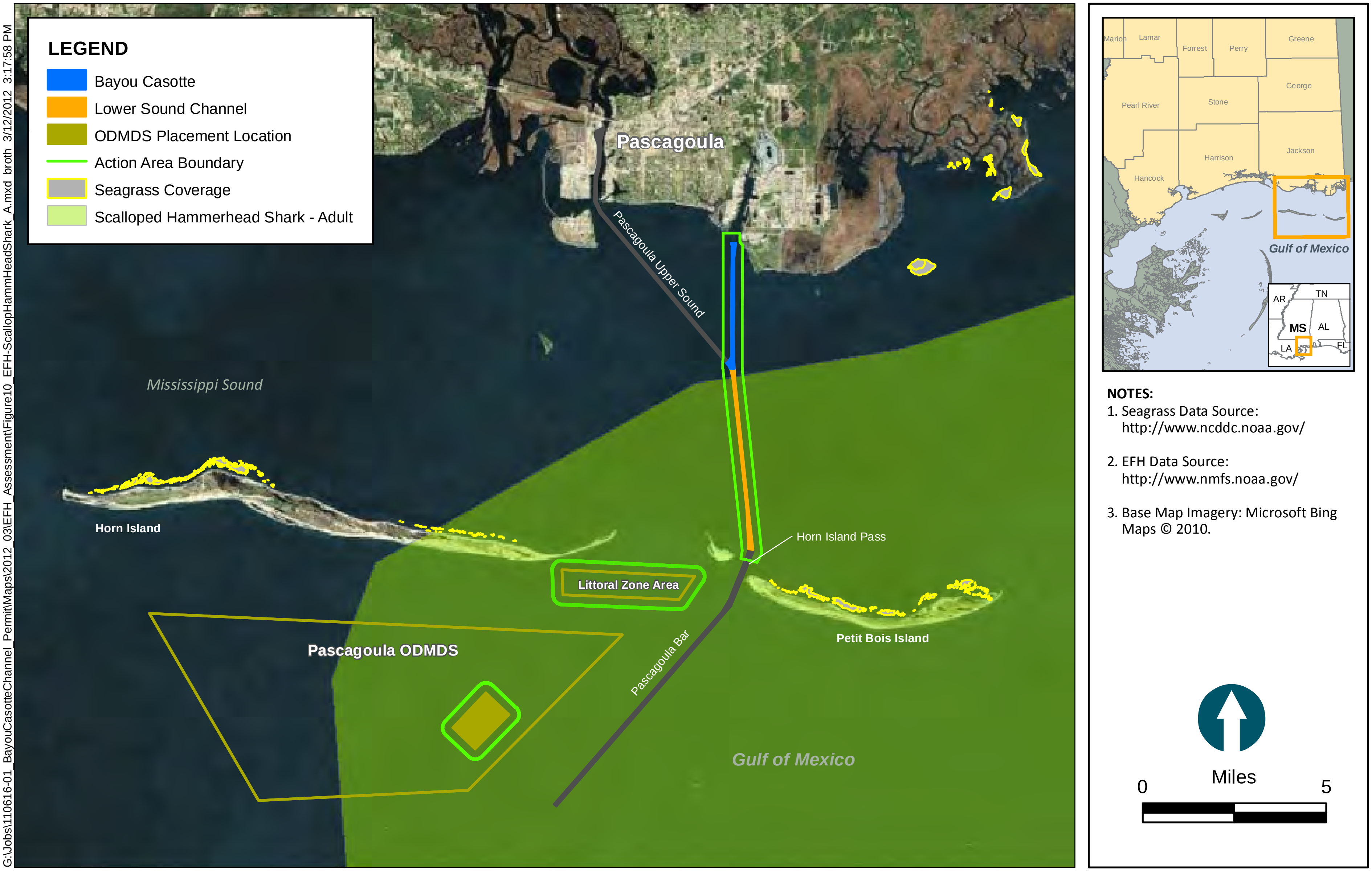
Figure 9
Essential Fish Habitat – Bonnethead Shark
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project

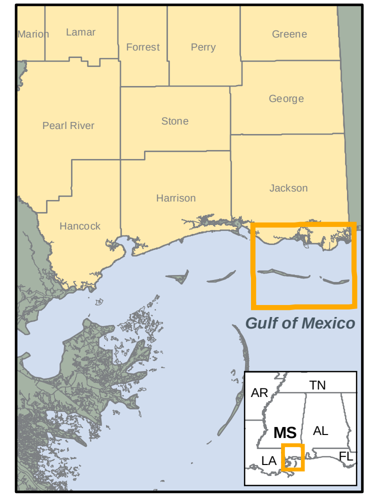
G:\Jobs\110616-01_BayouCasotteChannel_PermitMaps\2012_03\EFH_Assessment\Figure10_EFH-ScallopHammHeadShark_A.mxd broth 3/12/2012 3:17:58 PM



NOTES:
1. Seagrass Data Source: http://www.ncddc.noaa.gov/
2. EFH Data Source: http://www.nmfs.noaa.gov/
3. Base Map Imagery: Microsoft Bing Maps © 2010.

ANCHOR QEA

Figure 10
Essential Fish Habitat – Scalloped Hammerhead Shark (Adult)
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project



NOTES:

1. Seagrass Data Source: http://www.ncddc.noaa.gov/
2. EFH Data Source: http://www.nmfs.noaa.gov/
3. Base Map Imagery: Microsoft Bing Maps © 2010.

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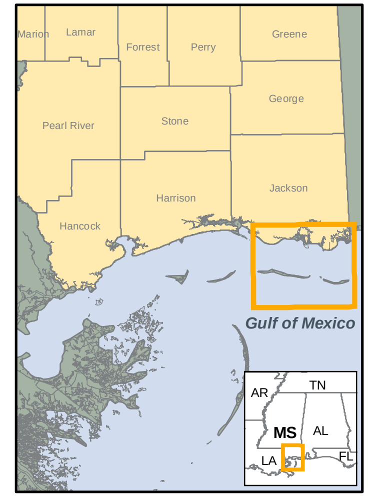
ANCHOR QEA

Figure 11
Essential Fish Habitat – Scalloped Hammerhead Shark (Juvenile)
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project



NOTES:
1. Seagrass Data Source: http://www.ncddc.noaa.gov/
2. EFH Data Source: http://www.nmfs.noaa.gov/
3. Base Map Imagery: Microsoft Bing Maps © 2010.

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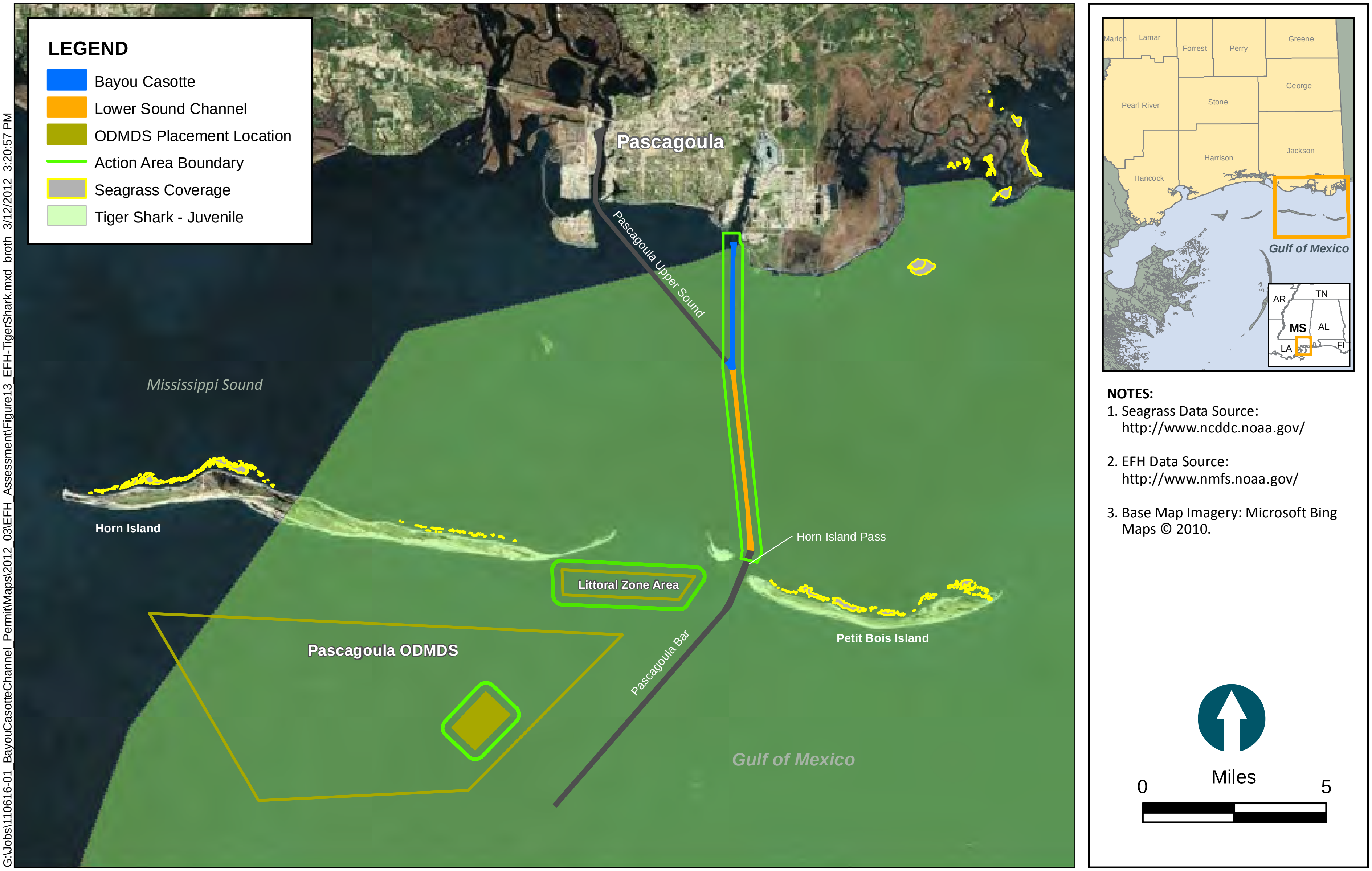
ANCHOR QEA

Figure 12
Essential Fish Habitat – Scalloped Hammerhead Shark (Neonate)
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project



G:\Jobs\110616-01_BayouCasotteChannel_Permit\Maps\2012_03\EFH_Assessment\Figure13_EFH-TigerShark.mxd broth 3/12/2012 3:20:57 PM

NOTES:

1. Seagrass Data Source: http://www.ncddc.noaa.gov/
2. EFH Data Source: http://www.nmfs.noaa.gov/
3. Base Map Imagery: Microsoft Bing Maps © 2010.

ANCHOR QEA

Figure 13
Essential Fish Habitat – Tiger Shark (Juvenile)
Essential Fish Habitat Assessment
Bayou Casotte and Lower Pascagoula Sound Channel Widening Project

-----Original Message-----
From: Hegji, Philip A SAM [mailto:Philip.A.Hegji@usace.army.mil]
Sent: Wednesday, July 25, 2012 11:51 AM
To: Fitzgibbons, Kimberly D; Latham, Pam
Subject: FW: Jackson County Port Authority SAM-2011-00389-PAH DraftEnvironmental Impact Statement (1204-02) and Essential Fish HabitatAssessment (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

-----Original Message-----
From: Jacobson, Jennifer L SAM
Sent: Wednesday, July 25, 2012 10:49 AM
To: Hegji, Philip A SAM
Subject: FW: Jackson County Port Authority SAM-2011-00389-PAH Draft Environmental Impact Statement (1204-02) and Essential Fish Habitat Assessment

Jenny Jacobson
Chief, Coastal Environment Team
Planning & Environmental Division
109 St. Joseph Street
Mobile, Alabama 36602
Email - Jennifer.L.Jacobson@usace.army.mil
Office Phone - 251/690-2724
Fax Line - 251/690-2727
Celluar - 251/472-7589

-----Original Message-----
From: Mark Thompson [mailto:mark.thompson@noaa.gov]
Sent: Wednesday, July 25, 2012 10:26 AM
To: Philp.A.Hegji@usace.army.mil; Jacobson, Jennifer L SAM
Cc: Paul_Necaise@fws.gov; George Ramseur; Ryan Hendren; Veronica Beech; Willa.Brantley@dmr.ms.gov; Florance_Watson@deq.state.ms.us
Subject: Jackson County Port Authority SAM-2011-00389-PAH Draft Environmental Impact Statement (1204-02) and Essential Fish Habitat Assessment

NOAA's National Marine Fisheries Service, Habitat Conservation Division, has reviewed the draft environmental impact statement (EIS) and essential fish habitat (EFH) assessment for the Bayou Casotte and Lower Pascagoula Sound Channel Widening project. This project and its future maintenance are being processed separately with the Corps of Engineers (COE), Mobile District, Regulatory Division, preparing an EIS (Regulatory EIS) for the channel widening and, as addressed in the July 19, 2012, webinar/interagency conference call, the Planning and Environmental Division is preparing an EIS (Civil Works EIS) for uncontained open water disposal for the future maintenance needs of the new channel. The Civil Works EIS and Feasibilty Study are being prepared concurrently to evaluate whether there is a Federal interest in assuming maintenance of the widened channel.

The channel widening project will result in the excavation of 3.35 million cubic yards (mcy) of sediments from 87 acres of estuarine waterbottoms. Most (3.3 mcy) of the excavated material is proposed to be placed in the Pascagoula Ocean Disposal Material Disposal Site with 125,000 cy to be placed in the Littoral Disposal Area in the Gulf of Mexico. All of this material has the potential to be utilized in a beneficial use manner and, in considering historic tidal wetland losses in Mississippi being around 10,000 acres, HCD believes the Jackson County Port Authority and COE Regulatory Division should further explore every opportunity to utilize this material to restore these tidal wetlands. Also, any future maintenance material from this project should be utilized in a beneficial use manner. Therefore, the Regulatory and the Civil Works EISs should fully address the beneficial use options, and, as you are aware, the Round Island Beneficial Use site is soon to be permitted and may be available to accomodate all or some of the excavated material. HCD staff is available to assist in developing this and other beneficial use options.

In regard to the EFH assessment, we note that it comes to the conclusion that disturbance of these areas will not be significance to EFH as a whole given that widening would make up approximately 0.001 square mile of the total 1,850 square miles of Mississippi Sound. Mississippi Sound is made up of a diversity of bottom habitats which supports a diversity of species and each impact should be addressed on an individual and cumulative basis, not based on its relative percentage to a chosen subset. The conversion of 87 acres of shallow estuarine bottom to a hypoxic, deep water channel habitat will result in an adverse impact to EFH and to those living marine resources that the shallow water habitat supports.

We appreciate the opportunity to provide these comments and if you have questions, please contact us at this email address or at 850-234-5061.

Sincerely,

Mark Thompson

Team Leader
Habitat Conservation Division
Florida Gulf Coast, Alabama, Mississippi
Panama City Office 850-234-5061
Fax 850-234-2492

Classification: UNCLASSIFIED
Caveats: NONE

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

April 3, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Agency Workshop for the Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Mississippi Department of
Archives and History
Attention: Mr. Greg Williamson
100 State Street
Jackson, Mississippi 39201

Dear Mr. Williamson:

This is to notify you of the upcoming agency workshop for the proposed widening of Pascagoula Lower Sound/Bayou Casotte Channel. The purpose of the workshop is to present the proposed project and discuss the findings of Draft Environmental Impact Statement (DEIS). You or your representative is invited to attend this workshop, to be held Thursday, May 10, 2012, from 2:00 p.m. to 4:00 p.m., at the Grand Magnolia Ballroom located at 3604 Magnolia Street, Pascagoula, Mississippi, as indicated on the enclosed map.

On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application for authorization to impact wetlands and other waters of the United States associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel (the proposed project). The proposed project is located in Pascagoula Sound, Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365° North, Longitude 88.556° West).

The Corps prepared the DEIS to assess the potential environmental impacts associated with the proposed project. The proposed project evaluated in the DEIS is the dredging of approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Channel segment to widen the channel from the Federally authorized width of 350 feet and depth of -42 feet mean lower low water (MLLW) (with 2 feet of allowable over depth and 2 feet of

advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of -42 feet MLLW. The proposed project would include placement of approximately 3.35 cubic yards of dredged material resulting from the channel modification.

The JCPA requested a Department of the Army (DOA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 103 of the Marine Protection, Research and Sanctuaries Act and Section 404 of the Clean Water Act, including a Section 404(b)(1) analysis to help ensure compliance. The Corps is the lead Federal agency for the preparation of this DEIS in compliance with the requirements of the National Environmental Policy Act (NEPA) and the President's Council on Environmental Quality regulations for implementing NEPA. The National Marine Fisheries Service and the U.S. Coast Guard are cooperating agencies for the preparation of the EIS. This application was advertised by a 30-day Public Notice April 15, 2011.

On April 13, 2012, a copy of the DEIS will available for public review. The DEIS is available to the public at: www.sam.usace.army.mil/rd/reg. Hard copies of the DEIS are available upon request from Mr. Philip A. Hegji, Corps' Project Manager, Post Office Box 2288, Attention: RD-C-M, Hegji, Mobile, Alabama 36628-0001. This document is being circulated to resource agencies and interested members of the public for a 45-day comment period ending May 29, 2012.

An informal open house followed by a public hearing will be held after the workshop from 6:00 p.m. until 7:00 p.m. in the Grand Magnolia Ballroom to allow the public the opportunity to become familiar with the proposed project prior to the start of the formal hearing. The formal public hearing will begin at 7:00 p.m. Those in need of language interpreters should contact the Corps' Public Involvement consultant, Crouch Environmental Services (713) 868-1043, by Thursday, May 3, 2012, to make arrangements.

The public hearing will be held to provide information about the proposed project and to receive public input and comment on the DEIS. The Corps invites full public participation to promote open communication on the issues surrounding the DEIS. In addition, participation by Federal, State, local agencies and other interested organizations is encouraged. Both oral and written statements will be accepted at the hearing. An informal open house will be held. Displays of the proposed project and associated impacts will be available. Representatives of the JCPA will be present to answer questions concerning the project and Corps representatives will be available to answer questions concerning the Corps' Regulatory process.

Any comments received at the hearing will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposed project. All comments will be

considered in the final EIS pursuant to NEPA. Comments are also used to help determine the overall public interest of the proposed project. All comments must be received or postmarked by May 29, 2012, (19 days following the public hearing).

If you have any questions prior to May 10, 2012, please contact me by email at philip.a.hegji@usace.army.mil or by phone (251) 690-3222. Correspondence concerning this project should refer to Number **SAM-2011-00389-PAH**.

Sincerely,

Philip A. Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Enclosures

Hegji/3222/nj

Young/

File:

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

April 3, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Agency Workshop for the Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Mississippi Department of
Environmental Quality
Attention: Ms. Carrie Barefoot
Post Office Box 2261
Jackson, Mississippi 39225-2261

Dear Ms. Barefoot:

This is to notify you of the upcoming agency workshop for the proposed widening of Pascagoula Lower Sound/Bayou Casotte Channel. The purpose of the workshop is to present the proposed project and discuss the findings of Draft Environmental Impact Statement (DEIS). You or your representative is invited to attend this workshop, to be held Thursday, May 10, 2012, from 2:00 p.m. to 4:00 p.m., at the Grand Magnolia Ballroom located at 3604 Magnolia Street, Pascagoula, Mississippi, as indicated on the enclosed map.

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advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of -42 feet MLLW. The proposed project would include placement of approximately 3.35 cubic yards of dredged material resulting from the channel modification.

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Sincerely,

Philip A. Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Enclosures

Hegji/3222/nj PAH
Young 4/9/12
File:

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

April 3, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Agency Workshop for the Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Mississippi Department of
Environmental Quality
Attention: Ms. Maya Rao
Post Office Box 2261
Jackson, Mississippi 39225-2261

Dear Ms. Rao:

This is to notify you of the upcoming agency workshop for the proposed widening of Pascagoula Lower Sound/Bayou Casotte Channel. The purpose of the workshop is to present the proposed project and discuss the findings of Draft Environmental Impact Statement (DEIS). You or your representative is invited to attend this workshop, to be held Thursday, May 10, 2012, from 2:00 p.m. to 4:00 p.m., at the Grand Magnolia Ballroom located at 3604 Magnolia Street, Pascagoula, Mississippi, as indicated on the enclosed map.

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Sincerely,

Philip A. Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Enclosures

Hegji/3222/nj /PAH
Young/ 4/4/11
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U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

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Regulatory Division

SUBJECT: Department of the Army Agency Workshop for the Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Mississippi Department of
Marine Resources
Attention: Mr. George Ramseur
1141 Bayview Avenue
Biloxi, Mississippi 39530

Dear Mr. Ramseur:

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Philip A. Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Enclosures

Hegji/3222/nj

Young/

File:

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CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

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Regulatory Division

SUBJECT: Department of the Army Agency Workshop for the Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Mississippi Department of
Marine Resources
Attention: Mr. Ron Cole
1141 Bayview Avenue
Biloxi, Mississippi 39530

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Project Manager, Coastal Mississippi
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Enclosures

Hegji/3222/nj

Young/

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CORPS OF ENGINEERS
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SUBJECT: Department of the Army Agency Workshop for the Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Application Number SAM-2011-00389-PAH, Jackson County Port Authority

National Marine
Fisheries Service
Attention: Ms. Veronica Beech
3500 Delwood Beach Road
Panama City, Florida 32408

Dear Ms. Beech:

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Project Manager, Coastal Mississippi
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Hegji/3222/nj

Young/

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National Marine
Fisheries Service
Attention: Mr. Ryan Hendren
263 13th Avenue South
St. Petersburg, Florida 33701

Dear Mr. Hendren:

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U.S. Fish and Wildlife Service
Attention: Mr. Paul Necaise
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

Dear Mr. Necaise:

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The public hearing will be held to provide information about the proposed project and to receive public input and comment on the DEIS. The Corps invites full public participation to promote open communication on the issues surrounding the DEIS. In addition, participation by Federal, State, local agencies and other interested organizations is encouraged. Both oral and written statements will be accepted at the hearing. An informal open house will be held. Displays of the proposed project and associated impacts will be available. Representatives of the JCPA will be present to answer questions concerning the project and Corps representatives will be available to answer questions concerning the Corps' Regulatory process.

Any comments received at the hearing will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposed project. All comments will be considered in the final EIS pursuant to NEPA. Comments are also used to help determine the overall public interest of the proposed project. All comments must be received or postmarked by May 29, 2012, (19 days following the public hearing).

If you have any questions prior to May 10, 2012, please contact me by email at philip.a.hegji@usace.army.mil or by phone (251) 690-3222. Correspondence concerning this project should refer to Number **SAM-2011-00389-PAH**.

Sincerely,

Philip A. Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Enclosures

Hegji/3222nj

Young/

File:

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

April 3, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Agency Workshop for the Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Application Number SAM-2011-00389-PAH, Jackson County Port Authority

U.S. Coast Guard
Eighth District
Attention: Ms. Heather E. Stratton
Hale Boggs Federal Building
500 Poydras Street
New Orleans, Louisiana 70130

Dear Ms. Stratton:

This is to notify you of the upcoming agency workshop for the proposed widening of Pascagoula Lower Sound/Bayou Casotte Channel. The purpose of the workshop is to present the proposed project and discuss the findings of Draft Environmental Impact Statement (DEIS). You or your representative is invited to attend this workshop, to be held Thursday, May 10, 2012, from 2:00 p.m. to 4:00 p.m., at the Grand Magnolia Ballroom located at 3604 Magnolia Street, Pascagoula, Mississippi, as indicated on the enclosed map.

On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application for authorization to impact wetlands and other waters of the United States associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel (the proposed project). The proposed project is located in Pascagoula Sound, Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365° North, Longitude 88.556° West).

The Corps prepared the DEIS to assess the potential environmental impacts associated with the proposed project. The proposed project evaluated in the DEIS is the dredging of approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Channel segment to widen the channel from the Federally authorized width of 350 feet and depth of -42 feet mean lower low water (MLLW) (with 2 feet of allowable over depth and 2 feet of

advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of -42 feet MLLW. The proposed project would include placement of approximately 3.35 cubic yards of dredged material resulting from the channel modification.

The JCPA requested a Department of the Army (DOA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 103 of the Marine Protection, Research and Sanctuaries Act and Section 404 of the Clean Water Act, including a Section 404(b)(1) analysis to help ensure compliance. The Corps is the lead Federal agency for the preparation of this DEIS in compliance with the requirements of the National Environmental Policy Act (NEPA) and the President's Council on Environmental Quality regulations for implementing NEPA. The National Marine Fisheries Service and the U.S. Coast Guard are cooperating agencies for the preparation of the EIS. This application was advertised by a 30-day Public Notice April 15, 2011.

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If you have any questions prior to May 10, 2012, please contact me by email at philip.a.hegji@usace.army.mil or by phone (251) 690-3222. Correspondence concerning this project should refer to Number **SAM-2011-00389-PAH**.

Sincerely,

Philip A. Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Enclosures

Hegji/3222/nj

Young/

File:

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

April 3, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Agency Workshop for the Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Application Number SAM-2011-00389-PAH, Jackson County Port Authority

U.S. Environmental
Protection Agency
Attention: Mr. Doug Johnson
Region IV
61 Forsythe Street Southwest
Atlanta, Georgia 30303-8960

Dear Mr. Ainslie:

This is to notify you of the upcoming agency workshop for the proposed widening of Pascagoula Lower Sound/Bayou Casotte Channel. The purpose of the workshop is to present the proposed project and discuss the findings of Draft Environmental Impact Statement (DEIS). You or your representative is invited to attend this workshop, to be held Thursday, May 10, 2012, from 2:00 p.m. to 4:00 p.m., at the Grand Magnolia Ballroom located at 3604 Magnolia Street, Pascagoula, Mississippi, as indicated on the enclosed map.

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advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of -42 feet MLLW. The proposed project would include placement of approximately 3.35 cubic yards of dredged material resulting from the channel modification.

The JCPA requested a Department of the Army (DOA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 103 of the Marine Protection, Research and Sanctuaries Act and Section 404 of the Clean Water Act, including a Section 404(b)(1) analysis to help ensure compliance. The Corps is the lead Federal agency for the preparation of this DEIS in compliance with the requirements of the National Environmental Policy Act (NEPA) and the President's Council on Environmental Quality regulations for implementing NEPA. The National Marine Fisheries Service and the U.S. Coast Guard are cooperating agencies for the preparation of the EIS. This application was advertised by a 30-day Public Notice April 15, 2011.

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Sincerely,

Philip A. Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Enclosures

Hegji/3222/nj

Young/

File:

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

April 3, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Agency Workshop for the Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Application Number SAM-2011-00389-PAH, Jackson County Port Authority

U.S. Environmental
Protection Agency
Attention: Mr. Bill Ainslie
Region IV
61 Forsythe Street Southwest
Atlanta, Georgia 30303-8960

Dear Mr. Ainslie:

This is to notify you of the upcoming agency workshop for the proposed widening of Pascagoula Lower Sound/Bayou Casotte Channel. The purpose of the workshop is to present the proposed project and discuss the findings of Draft Environmental Impact Statement (DEIS). You or your representative is invited to attend this workshop, to be held Thursday, May 10, 2012, from 2:00 p.m. to 4:00 p.m., at the Grand Magnolia Ballroom located at 3604 Magnolia Street, Pascagoula, Mississippi, as indicated on the enclosed map.

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Sincerely,

Philip A. Hegji
Project Manager, Coastal Mississippi
Regulatory Division

Enclosures

Hegji/3222/nj
Young
File:

Directions to the **Grand Magnolia Ballroom**

<u>From East Pascagoula or Kreole area:</u>

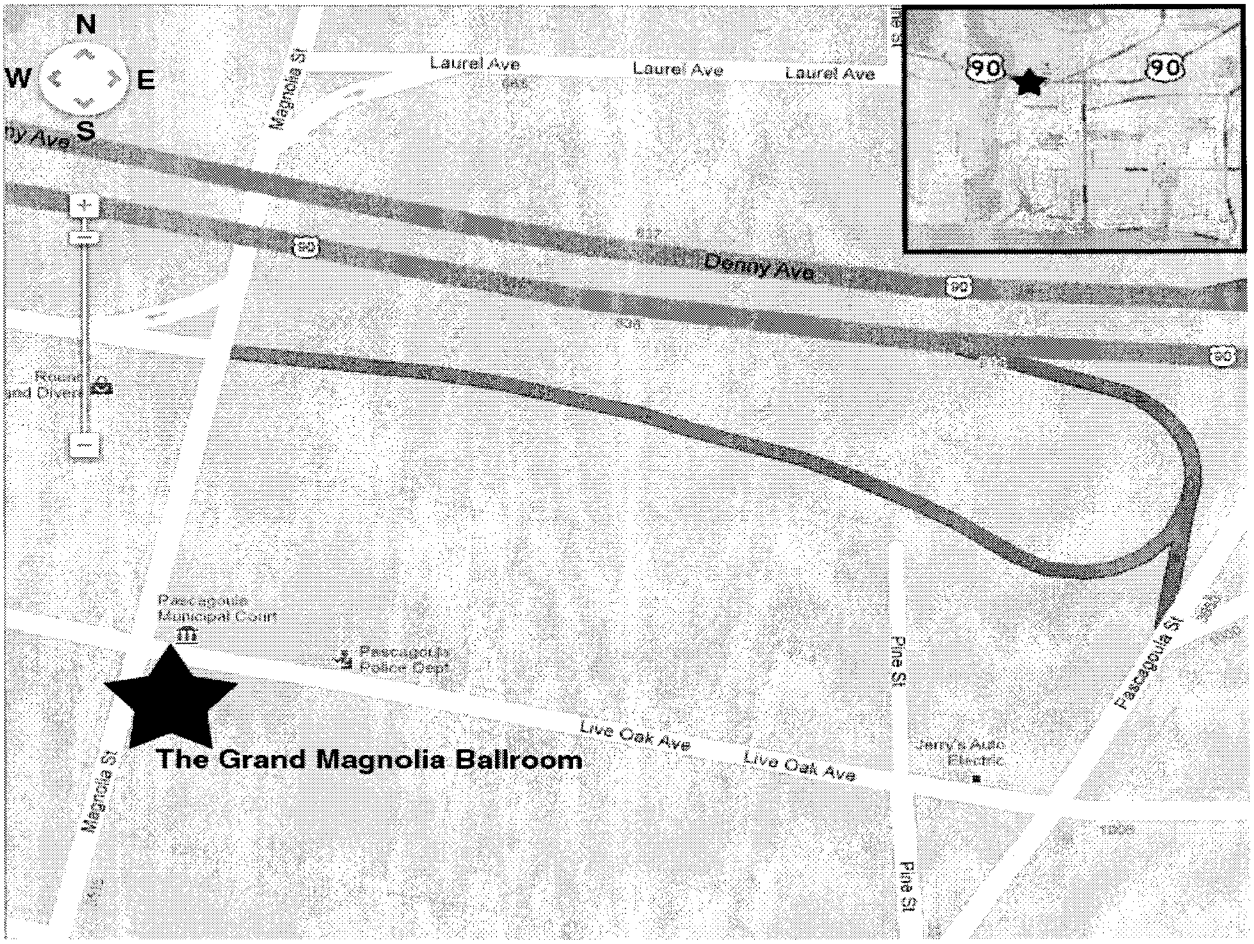
Proceeding west on Highway 90 (Denny Avenue). Turn left onto Pascagoula Street. Turn right on Live Oak Avenue. The Grand Magnolia Ballroom is at the intersection of Magnolia Street and Live Oak Avenue across the street from the Pascagoula Municipal Court.

<u>From Moss Point area:</u>

Take Highway 613 South (Main Street/Telephone Road). Main Street becomes Telephone Road after crossing Jefferson Avenue. Continue south on Telephone Road to Market Street. Turn left onto Market Street. Cross Denny Avenue (Highway 90). Turn left onto Live Oak Avenue from Market Street. Cross Pascagoula Street turn onto Live Oak Avenue. The Grand Magnolia Ballroom is at the intersection of Magnolia Street and Live Oak Avenue across the street from the Pascagoula Municipal Court.

Address is as follows:

The Grand Magnolia Ballroom
3604 Magnolia Street
Pascagoula, Mississippi 39567


N
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Laurel Ave
Laurel Ave
Laurel Ave
Magnolia St
Denny Ave
90
Pascagoula
Municipal Court
Pascagoula
Police Dept
Live Oak Ave
Live Oak Ave
Pine St
Pine St
Jerry's Auto
Electric
Pascagoula St
Magnolia St
The Grand Magnolia Ballroom

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

April 4, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the army Draft Environmental Impact Statement Notice of Availability; Application Number SAM-2011-00389-PAH

U.S. Environmental
Protection Agency
Office of Federal Activities
EIS Filing Section
Attention: Ms. Dawn Roberts
Ariel Rios Building (South Oval Lobby), Room 7220
1200 Pennsylvania Avenue Northwest
Washington, DC 20004

Dear Ms. Roberts:

On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application to the U.S. Army Corps of Engineers (Corps), Mobile District, Mississippi Department of Environmental Quality and the Mississippi Department of Marine Resources for authorization to impact wetlands and other waters of the United States associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel (the proposed project), Jackson County. The proposed project is located in the Pascagoula Lower Sound/Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365° North, Longitude 88.556° West).

The JCPA requested a Department of the Army (DOA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 103 of the Marine Protection, Research and Sanctuaries Act and Section 404 of the Clean Water Act, including a Section 404(b)(1) analysis to help ensure compliance. The Corps is the lead Federal agency for the preparation of this Draft Environmental Impact Statement (DEIS) in compliance with the requirements of the National Environmental Policy Act (NEPA) and the President's Council on Environmental Quality regulations for implementing NEPA. The National Marine Fisheries Service and the U.S. Coast Guard are cooperating agencies for the preparation of the EIS. This application was advertised by 30-day Public Notice April 15, 2011.

The Corps prepared a Draft Environmental Impact Statement (DEIS) to assess the potential environmental impacts associated with the proposed project. The proposed project is the dredging of approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Channel segment to widen the channel from the Federally authorized width of 350 feet and depth of

-42 feet mean lower low water (MLLW) (with 2 feet of allowable over-depth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of -42 feet MLLW. The proposed project would include the placement of approximately 3.35 million cubic yards of dredged material resulting from the channel modification.

With this letter, the Corps transmits/files the DEIS to/with the Environmental Protection Agency. On April 13, 2012, a copy of the DEIS will be made available for public review. The DEIS will be available to the public at: www.sam.usace.army.mil/rd/reg. Hardcopies of the DEIS are available upon request from Mr. Philip A. Hegji, Corps' Project Manager (contact information below). This document is being circulated to resource agencies and interested members of the public for a 45-day comment period ending May 29, 2012. A copy of this letter is being furnished to the U.S. Environmental Protection Agency, Region IV, Attention: Ms. N'tale Kajumba, Regulatory Program, 61 Forsyth Street, 15th Floor, Atlanta, Georgia 30303.

If you have any questions or comments, please contact Mr. Hegji at (251) 690-3222 or by email at philip.a.hegji@usace.army.mil. Please refer to Number SAM-2011-00389-PAH.

Sincerely,

Matthew Schanck

for Cindy J. House-Pearson
Chief, Regulatory Division

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

April 30, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army (DA) Permit Application, Essential Fish Habitat - Effects Determination for Project SAM-2011-00389-PAH, Jackson County Port Authority

National Marine Fisheries Service
Conservation Habitat Division
Attention: Ms. Veronica Beech
3500 Delwood Beach Road
Panama City, Florida 32408

Dear Ms. Beech:

Reference a permit application submitted by the Jackson County Port Authority, requesting authorization from the Department of the Army (DA) to expand the Bayou Casotte Navigation Channel located in Section 10 waters within the Mississippi Sound in the vicinity of Bayou Casotte, Jackson County, Mississippi. The DA application number associated with the project is SAM-2011-00389-PAH. This project will result in the excavation of 3.35 million yds^3 of water bottoms. This project is being processed as an Environmental Impact Statement (EIS) and is being coordinated with the National Marine Fisheries Service through this letter.

At this time, we are initiating **formal consultation** for the EIS as a whole (please refer to the enclosed Essential Fish Habitat Assessment for a complete discussion). **In accordance with Section 7 of the Endangered Species Act, please respond on your interpretation of the completeness of the enclosed assessment.**

If you have any questions regarding this correspondence, please contact me at (251) 690-3222 or by email at philip.a.hegji@usace.army.mil. Thank you for your cooperation with our permit program.

Sincerely,

Philip A. Hegji
Project Manager
Regulatory Division

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

April 30, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application, Endangered Species Act - Effects Determination for Project SAM-2011-00389-PAH, Jackson County Port Authority

National Marine Fisheries Service
Attention: Mr. David Bernhart
9721 Executive Center Drive North
St. Petersburg, Florida 33772

Dear Mr. Bernhart:

Reference a permit application submitted by the Jackson County Port Authority, requesting authorization from the Department of the Army (DA) to expand the Bayou Casotte Navigation Channel located in Section 10 waters within the Mississippi Sound in the vicinity of Bayou Casotte, Jackson County, Mississippi. The DA application number associated with the project is SAM-2011-00389-PAH. This project will result in the excavation of 3.35 million yds^3 of water bottoms. This project is being processed as an Environmental Impact Statement (EIS) and is being coordinated with the National Marine Fisheries Service, who is acting as a cooperating agency on this EIS, through this letter.

At this time, we are initiating **formal consultation** for the EIS as a whole (please refer to the enclosed Biological Assessment (BA) for a complete list of species and effects determinations). **In accordance with Section 7 of the Endangered Species Act, please respond on your interpretation of the completeness of the enclosed BA.**

If you have any questions regarding this correspondence, please contact me at (251) 690-3222 or by email at philip.a.hegji@usace.army.mil. Thank you for your cooperation with our permit program.

Sincerely,

Philip A. Hegji
Project Manager
Regulatory Division

Enclosure

Choctaw Nation of Oklahoma

P.O. Box 1210 • Durant, OK 74702-1210 • (580) 924-8280

Gregory E. Pyle
Chief

Gary Batton
Assistant Chief

May 8, 2012

Mr. Phillip Hegji
Project Manager
Mobile District, Corp of Engineers
P.O. Box 2288
Mobile, Alabama 36628-0001

RE: Public Notice No: SAM-2011-00389-PAH, draft EIS for proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Jackson County, Mississippi

Dear Mr. Hegji,

Thank you for sending the correspondence regarding Public Notice No: SAM-2011-00389-PAH, draft EIS for proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Jackson County, Mississippi. Jackson County, MS is within the historic area of interest to the Choctaw Nation of Oklahoma. Before we can comment on the likelihood of this project affecting Choctaw historic or sacred sites, we request a copy of any archaeological surveys that have been completed regarding this project area, as well as any correspondence you have received from the Mississippi SHPO concerning this project.

Please contact me with any question or concerns. Thank you.

Sincerely,

Dr. Ian Thompson
Director, Historic Preservation Department
THPO, Tribal Archaeologist, NAGPRA Specialist
Choctaw Nation of Oklahoma
PO Drawer 1210
Durant, OK 74701

By: Johnnie Jacobs
Section 106 Coordinator
jjacobs@choctawnation.com

MAY 10 2012

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

May 15, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Notice of Adverse Effect on Historic Properties, Pascagoula Harbor Navigation Channel Widening for Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority

Advisory Council on
Historic Preservation
Office of Federal Agency Programs
Attention: Mr. Reid Nelson, Director
Suite 809
1100 Pennsylvania Avenue Northwest
Washington, D.C. 20004

Dear Mr. Nelson:

The U.S. Army Corps of Engineers, Mobile District (Corps), is proposing to permit and/or sponsor widening portions of the Pascagoula Harbor Navigation Channel (PHNC) by dredging (Enclosure I). The project would include segments of the Lower PHNC and Bayou Casotte Channel. The proposed dredging project is to improve navigation for continued channel operation and maintenance. The PHNC is located within the waters of the Mississippi Sound and Pascagoula River Delta, Jackson County, Mississippi. The action is being reviewed concurrently by the Corps' Planning Division as part of a study investigation and by Regulatory Division under application Number SAM-2011-00389-PAH.

As per requirements outlined in Section 106 of the National Historic Preservation Act, the Corps must consider the effects of the proposed action on historic properties. The Pascagoula Harbor and the PHNC were previously surveyed for cultural resources in anticipation of the 1986 improvement project (Mistovich et al. 1983). In addition to the previous survey work, a complete records and historic background study of the project area was conducted by CH2MHill in June 2007.

The identified Area of Potential Effect (APE) of the project contains several archaeological sites including the Big and Little Greenwood Island sites (22JA516 and 22JA618) and a post-Mexican War era cemetery associated with Camp Jefferson Davis [see "Archaeological Survey and Testing of Greenwood Island and the Bayou Casotte Proposed Port Facilities, Jackson County, Mississippi" (Solis and Walling 1982) among others].

In consultation with the Mississippi State Historic Preservation Officer (MSSHPO) (initiated via April 18, 2011 letter and responses dated May 10 and July 29, 2011), a testing plan was begun to determine the integrity of the identified resources. Examination of the sites has found a small portion (7 meters by 20 meters) of prehistoric site 22JA516 remains intact and eligible for listing on the National Register of Historic Places under Criterion D.

Based on the existence of an Historic Properties within the APE, the Corps has determined that the proposed action will have an adverse effect on Historic Properties as per 36 CFR 800.5(d)(2). The Corps is proposing to resolve the adverse effects to the site through a mitigation plan. The mitigation will be determined through continued consultation with the MSSHPO and codified as required through implementation of a Memorandum of Agreement.

In accordance with 36 CFR 800.6(a) (1) this letter is official notification of the adverse effect finding. At this time, the Corps does not anticipate objections to the proposed resolution of adverse effects and thus does not request Council participation in the review process. However should the Council wish to participate or disagreements arise between consultation participants, Council participation would be welcome. Please contact Mr. Matt Grunewald at (251) 694-4107 or via email at matthew.m.grunewald@usace.army.mil with any questions or interest.

Sincerely,

Damon M. Young
Chief, Coastal Branch
Regulatory Division

Enclosures

Hegji/3222/nj

Young

File:

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

May 15, 2012

Coastal Branch
Regulatory Division

SUBJECT: Department of the Army Notice of Adverse Effect on Historic Properties, Pascagoula Harbor Navigation Channel Widening for Permit Application Number SAM-2011-00389-PAH, Jackson County Port Authority

State Historic Preservation Officer
Mississippi Department of
Archives and History
Section 106 Review and Compliance
Attention: Mr. Greg Williamson
Post Office Box 571
Jackson, Mississippi 39205-0571

Dear Mr. Williamson:

The U.S. Army Corps of Engineers, Mobile District (Corps) has completed the survey and testing program for the Pascagoula Harbor Navigation Channel (PHNC), Bayou Casotte Channel widening project. This action is being reviewed concurrently by the Corps' Planning Division as part of a study investigation and by Regulatory Division under the Corps application Number SAM-2011-00389-PAH.

Remains of at least one historic grave shaft were found, although no new graves or human remains were identified. Examination of the prehistoric sites has found a small portion (7 meters by 20 meters) of prehistoric site 22JA516 remains intact and eligible for listing on the National Register of Historic Places under Criterion D (see attached Phase II Studies).

Based on the existence of an *Historic Properties* within the APE, the Corps has determined the proposed action will have an adverse effect on *Historic Properties* as per 36 CFR 800.5(d)(2). The Corps proposing to resolve the adverse effects to the site through mitigation plan. The mitigation will be determined through continued consultation with your office and will be codified as required through the development of a Memorandum of Agreement.

In accordance with 36 CFR 800.6(a) (1) an official notification of the adverse effect finding will be forwarded to the Advisory Council on Historic Preservation (Council). At this time, the Corps does not anticipate objections to the proposed resolution of adverse effects and thus is not requesting Council participation in the review process. However should the Council wish to participate or disagreements arise between consultation participants, Council participation would be welcome.

In addition, formal government-to-government consultation is being initiated with the following Native American Tribes: Choctaw of Oklahoma, Mississippi Band of Choctaw Indians, the Jena Band of Choctaw and the Tunica-Biloxi Tribe. If any tribe expresses interest in participating in this consultation or identifies other possible interested tribes, your office will also be notified.

The Corps respectively requests your concurrence on our determination of an adverse effect on *Historic Properties* as per 36 CFR 800.5(d)(2) by the proposed action. We look forward to continuing working with you on this project. Please contact Mr. Matt Grunewald at (251) 694-4107 or via email at matthew.m.grunewald@usace.army.mil with further questions or comments.

Sincerely,

Damon M. Young
Chief, Coastal Branch

Enclosures

Hegji/3222/nj

Young

File:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

Philip

May 29, 2012

JUN 01 2012

U.S. Army Corps of Engineers, Mobile District
Planning and Environmental Division
P.O. Box 2288
Mobile, AL 36628-0001

Attention: Mr. Philip A. Hegji

Subject: EPA Comments on the Draft Environmental Impact Statement (DEIS) for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casottee Channel, Pascagoula, Jackson County, MS; CEQ #:20120101; ERP #: COE-E35087-MS.

Dear Mr. Hegji:

Pursuant to Section 309 of the Clean Air and Section 102(2)(C) of the National Environmental Policy Act (NEPA), EPA, Region 4 has reviewed the subject document. The U.S. Army Corps of Engineers (USACE) project evaluates the consequences of the Jackson County Port Authorities proposal to widen the Pascagoula Lower Sound/Bayou Casotte Channel segment from the Federally authorized width of 350 feet and depth of -42 feet mean lower low water (MLLW) (with 2 ft of allowable over-depth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing authorized depth of -42 feet MLL. The project also involves the limited widening of the northern portion of the Horn Island Pass channel in the Port of Pascagoula.

The primary purpose and need for the proposed widening is to alleviate current vessel restrictions and increase travel efficiencies for marine vessel moving into and out of Pascagoula and Bayou Casotte Harbor. According to the DEIS, "economic pressure and technological advances have generally resulted in a trend towards the production of larger ships, which has increased channel improvement needs." Specific benefits anticipated include transit during dark hours for crude oil tankers (in ballast) and Panmax bulk carriers. Other benefits include "transit of liquefied natural gas tankers during high wind and current condition, two-way traffic under established conditions and improved terminal operations and increased productions hours due to decreased number of delays."

Three alternatives are examined in the DEIS, including a no-action and two action alternatives (i.e., widening locations and disposal sites). Enlarging the Harbor requires dredging of approximately 38,200 feet (7.2 miles) of the channel. The DEIS identifies a preferred alternative that involves dredging adjacent to the existing Pascagoula Lower Sound/Bayou Cassotte Federal Chanel segment to widen the channel 100 feet on the west side to the existing depth of -42 feet MLLW (with authorized advanced maintenance and allowable over depth excavation consistent with the Federal project) as opposed to widening the channel 50 feet on either side of the existing Channel segment. This alternative was selected because it alleviates more of the existing vessel transit restrictions (e.g., eases turns) than the project.

According to the DEIS, the project will result in the conversion of 87.6 acres of shallow habitat to deeper habitat and the disposal of approximately 3.4 million cubic yards of dredge material from the channel modification. The implementation of the preferred alternative will involve the placement of approximately 3.7% (125,000 cy) of material in the designated littoral zone area (LZA) for beneficial use and the rest of the material (approx. 3.3 mcy) in the Pascagoula Offshore Disposal Management Disposal Site (ODMDS). While both action alternatives will include relatively similar amounts of new dredge volume, the preferred alternative will result in a smaller amount of material being used for beneficial reuse. Most of the material will be hydraulically excavated by a hopper dredge, but some combination of hydraulic pipeline or mechanical dredge may also be used.

In terms of sediment quality, the DEIS indicates that certain samples are above the lead and dioxin criteria levels. The dioxin TEQ value exceedances were "attributable to the least toxic congener, indicating little likelihood of adverse impacts of dioxin congeners in sediments. Prior to placement of dredged material, concurrence by EPA is needed as to whether or not these findings meet guidance for the Limiting Permissible Concentration (LPC) for lead and dioxin congeners in sediments

Based on our review of this project, we have assigned a rating of EC-1. (environmental concerns, adequate information) to the DEIS. EPA notes that there may be sediment quality issues related to lead and/or dioxin as well as some short term water quality impacts associated with the dredging and placement process. Therefore, please note that there will be separate evaluation and communication regarding the *Marine, Protection, Research, and Sanctuaries Act* Section 103 process including the evaluation of supporting sediment physical, chemical, and biological testing reports, as well as the District Engineer's determination of the material's compliance with the Ocean Dumping Regulations. This review process will occur following the submittal of the DEIS comment letter. In addition, EPA recommends that every effort be made to institute appropriate control measure to reduce potential water quality impacts. In general, we commend the USACE on the beneficial use of some of the material, but would like to more material used in other areas along the Gulfcoast even though we understand that the transport costs can be cost prohibitive."

We appreciate your coordination with us. The EPA technical contacts will be Doug Johnson (404/562-9386) located in our Water Management Division, while our NEPA contact will be Ntale Kajumba (404/562-9620) of my staff.

Sincerely,

Mueller

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

Enclosure: EPA Rating System

Additional Comments for the ODMDS

The FEIS should discuss the proposed action in context of the ODMDS' Site Management and Monitoring Plan, see: http://epa.gov/region4/water/oceans/documents/Pascagoula_SMMP.pdf

The DEIS (p. 3-6) does not appear to address the available capacity directly in volume available for the proposed action, e.g., how much of the existing ODMDS is committed to other project uses?

The DEIS does not appear to address impacts to the existing ODMDS, e.g., how much is available for the proposed action's identified need?

Recommendation: The FEIS should clarify how much of the existing project is committed to other project uses and how much is available for the proposed action.

Preserving America's Heritage

May 31, 2012

Mr. Damon M. Young
Chief, Coastal Branch
Regulatory Division
Mobile District – Corps of Engineers
P.O. Box 2288
Mobile, AL 36628-0001

Ref: ***Proposed Pascagoula Harbor Navigation Channel Widening Project***
Mississippi Sound and Pascagoula River Delta, Jackson County, Mississippi

Dear Mr. Young:

On May 24, 2012, the Advisory Council on Historic Preservation (ACHP) received your documentation for the referenced project in accordance with Section 800.6(a)(1) of our regulations, "Protection of Historic Properties" (36 CFR Part 800). Unfortunately, the background documentation included with your submission does not meet the specifications listed in Section 800.11(e). We, therefore, are unable to determine whether Appendix A of the regulations, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, applies to this undertaking. Accordingly, we request that you submit the following information so that we can determine whether our participation is warranted.

- Copies or summaries of any views provided by consulting parties and the public, including comments from Indian tribes and the Mississippi State Historic Preservation Officer (SHPO).

Upon receipt of the additional information, we will notify you within 15 days of our decision. If you have any questions, please contact Anthony Guy Lopez at 202-606-8525, or via email at alopez@achp.gov.

Sincerely,

Raymond V. Wallace

Raymond V. Wallace
Historic Preservation Technician
Office of Federal Agency Programs

-----Original Message-----
From: Paul_Necaise@fws.gov [mailto:Paul_Necaise@fws.gov]
Sent: Tuesday, July 31, 2012 8:46 AM
To: Hegji, Philip A SAM
Cc: willa.brantley@dmr.ms.gov; veronica.beech@noaa.gov; ryan.hendren@noaa.gov; Jacobson, Jennifer L SAM; george.ramseur@dmr.ms.gov; phillip.sanderson@mmns.state.ms.us; mark.thompson@noaa.gov; florance_watson@deq.state.ms.us; Jolene_Williams@nps.gov
Subject: SAM-2011-00389/BCHIP (UNCLASSIFIED)

Philip,

The USFWS is concerned with the proposed disposal of �/- 3 million cubic yards of dredged material into the ocean south of the MS barrier islands. Our office submitted comments on this project (see attached), dated November 29, 2011, recommending the Port of Pascagoula (Port) establish a plan to beneficially use all suitable dredged material resulting from this project. The current Draft EIS only recognizes sandy sediments as �suitable� material in regards to beneficial use. Which is the portion (less than 200,000 cubic yards) of material currently proposed to be deposited in the littoral zone east of Horn Island. However, silts, clays, etc. should also be considered suitable material provided they are not considered contaminated by the standards set forth by the MS Beneficial Use Group (MS BUG).

The USFWS is highly engaged in the MS BUG, and we recognize that there is no site currently available to dispose of the non sandy (silts, clays, etc.) material that would result from the proposed project. However, the Port should become engaged with the MS BUG to develop a plan, as I suggested in my attached letter, in order to beneficially use all of the material proposed to be taken out of the sediment budget in the MS Sound as a result of this current plan. Further, it is the opinion of the Service that the current draft EIS does not adequately addresses our concerns regarding the impacts to the barrier islands (and sediment budget) as a result of the continued deepening and widening of the ship channels in MS. The significance of these impacts has been discovered by the Mobile Corps planning efforts that have taken place on the current Mississippi Coastal Improvements Plan's Barrier Island Restoration Projects. There are many efforts currently taking place in MS to restore the islands, marshes, and estuarine habitats. The impacts associated with the removal of several million cubic yards of sediment from the sediment budget in the MS Sound is significant and is contradicting to the ongoing efforts to negate those impacts.

As mentioned in the last paragraph of our attached letter, the Service recommends the Port engage the MS BUG in order to develop a plan to beneficially use all of the dredged material that results from the proposed project. To our knowledge the Port has not acted on our recommendation in this regard. Further, the Service understands that the EIS is focused on the current conditions, and currently there is no approved beneficial use site that can accommodate several million cubic yards of material. However, the Service recommends the EIS either consider the possibility of a site being established, or allow for a modification to the EIS (or project plan, permit, etc.) to beneficially use the material currently planned to be disposed in the deep water ocean disposal site, should a site be established.

There are other similar projects currently being planned by the MS BUG that the FWS believes could compliment each other in order to result in a more efficient and less damaging project. However, this alternative will require coordination with the MS BUG to determine the viability of this alternative. In summary, the USFWS is opposed to the current plan outlined in the Draft EIS. Further, the Service once again recommends the corps, the Port, and the resource agencies work together through the MS BUG to establish another alternative that would provide for the beneficial use of the material proposed to be dredged as a result of this project.

The Service appreciates the opportunity to comment on this project and looks forward to working with your office, the Port, and other resource agencies in developing a project plan that would maximize the benefits of the valuable sediments proposed to be displaced as a result of this project.

Paul Necaise
Fish and Wildlife Biologist
US Fish and Wildlife Service
Mississippi Field Office
6578 Dogwood View Parkway
Jackson, MS 39213
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Appendix E

Air Emissions Calculations Summary

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Table 1. Total Emissions Summary - 100 ft Widening
Bayou Casotte Harbor Channel Improvements Project

Air Contaminant	Total Tons
CO	**97.18**
NOX	**963.81**
PM	**23.91**
PM10	**22.95**
PM2.5	**21.76**
SOX	**48.12**
VOC	**8.71**
CO2	**63,899**
CH4	**8.17**
N2O	**1.82**
CO2e	**64,633**

	Total Tons										
Activity	**CO**	**NOX**	**PM**	**PM10**	**PM2.5**	**SOX**	**VOC**	**CO2**	**CH4**	**N2O**	**CO2e**
Dredging Activities	96.09	963.01	23.88	22.92	21.73	48.08	8.66	63820	8.16	1.81	64554
Centerline Range Relocation	0.07	0.70	0.02	0.02	0.02	0.03	0.01	46.20	0.01	0.00	46.73
On-Road – Work Truck and Employee Commuter Vehicles	1.02	0.11	0.01	0.01	0.01	0.00	0.04	16.05	0.001	0.001	16.27
Totals	**97.18**	**963.81**	**23.91**	**22.95**	**21.76**	**48.12**	**8.71**	**63883**	**8.16**	**1.81**	**64617**

Table 1a. Total Emissions Summary - 50 ft Widening to Either Side of Center
Bayou Casotte Harbor Channel Improvements Project

Air Contaminant	Total Tons
CO	**97.12**
NOX	**963.12**
PM	**23.89**
PM10	**22.94**
PM2.5	**21.74**
SOX	**48.08**
VOC	**8.70**
CO2	**63,852**
CH4	**8.16**
N2O	**1.81**
CO2e	**64,586**

	Total Tons										
Activity	**CO**	**NOX**	**PM**	**PM10**	**PM2.5**	**SOX**	**VOC**	**CO2**	**CH4**	**N2O**	**CO2e**
Dredging Activities	96.09	963.01	23.88	22.92	21.73	48.08	8.66	63820	8.16	1.81	64554
On-Road – Work Truck and Employee Commuter Vehicles	1.02	0.11	0.01	0.01	0.01	0.00	0.04	16.05	0.001	0.001	16.27
Totals	**97.12**	**963.12**	**23.89**	**22.94**	**21.74**	**48.08**	**8.70**	**63836**	**8.16**	**1.81**	**64570**

Table 2. Total NOx and VOC Emissions Summary - 100 ft Widening
Bayou Casotte Harbor Channel Improvements Project

SUMMARY OF NOx EMISSIONS (tpy)

Activity	2014	2015
Dredging Activities	481.50	481.50
Centerline Range Relocation		0.70
On-Road – Work Truck and Employee Commuter Vehicles	0.05	0.05
Totals	**481.56**	**482.26**

SUMMARY OF VOC EMISSIONS (tpy)

Activity	2014	2015
Dredging Activities	4.33	4.33
Centerline Range Relocation		0.01
On-Road – Work Truck and Employee Commuter Vehicles	0.02	0.02
Totals	**4.35**	**4.36**

Table 2a. Total NOx and VOC Emissions Summary - 50 ft Widening to Either Side of Center Bayou Casotte Harbor Channel Improvements Project

SUMMARY OF NOx EMISSIONS (tpy)

Activity	2014	2015
Dredging Activities	481.50	481.50
On-Road – Work Truck and Employee Commuter Vehicles	0.05	0.05
Totals	**481.56**	**481.56**

SUMMARY OF VOC EMISSIONS (tpy)

Activity	2014	2015
Dredging Activities	4.33	4.33
On-Road – Work Truck and Employee Commuter Vehicles	0.02	0.02
Totals	**4.35**	**4.35**

Table 3. Marine Engine Emission Factors and Fuel Consumption Algorithms
(in g/kW-hr, for all marine engines)

	Statistical Parameter		
Air Contaminant	**Exponent (x)**	**Intercept (b)**	**Coefficient (a)**
CO	1	0	0.8378
NO_X	1.5	10.4496	0.1255
PM	1.5	0.2551	0.0059
PM10	1.5	0.2551	0.0059
PM2.5	1.5	0.2551	0.0059
SO_X	n/a	0	2.3735
VOC (HC)	1.5	0	0.0667
CO2	1	648.6	44.1

Notes:

1.) All regressions but SO_2 are in the form of:

Emissions Rate (g/hp-hr) = (a*(Fractional Load)$^{-x}$ + b) * 0.7457
where the conversion factor of 0.7457 kW/hp is used to calculate the emission factor in g/hp-hr

2.) Fractional Load is equal to actual engine output divided by rated engine output.

3.) The SO_2 regression is the form of:

Emissions Rate (g/hp-hr) = a*(Fuel Sulfur Flow in g/hp-hr) + b
where Fuel Sulfur Flow is the Fuel Consumption times the sulfur content of the fuel;
The sulfur content for the fuel consumption regression was set to 1000 parts per million (0.10 wt%)
(anticipated fuel sulfur content per Maritime Pollution Prevention Act of 2008, Public Law 110-280, July 21, 2008, effective January 2015)

4.) **Fuel Consumption (g/hp-hr) = (14.12 / (Fractional Load) + 205.717) * 0.7457**

5.) n/a is not applicable, n/s is not statistically significant.

6.) All information shown above is detailed in Table 5-1 of the EPA technical report "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data", EPA 420-R-00-002, February 2000.

Table 4. Marine Equipment Emission Factors and Emission Rates - Hopper Dredging Vessels
Bayou Casotte Harbor Channel Improvements Project

	Dredge					Mob/Demob Towing	
	Generic Large Hopper Dredge			Crew/Survey Boat (Runabout)		Generic Large Hopper Dredge	
	Propulsion Oceangoing	Dredge Pump(s)	Auxiliary - Dredging	Propulsion	Secondary	Propulsion - Oceangoing	Auxiliary - Oceangoing
hp	4,350	1,700	3,345	381	97	4,350	3,345
Fuel Type	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Load Factor	0.8	0.8	0.8	0.4	0.2	0.8	0.8
Age Factor	-	-	-	-	-	-	-
Emission Factors (Gram/hp-hr)							
CO	0.780934	0.780934	0.780934	1.561869	3.123737	0.780934	0.780934
NO_X	7.923056	7.923056	7.923056	8.162195	8.838583	7.923056	7.923056
PM	0.196377	0.196377	0.196377	0.207619	0.239417	0.196377	0.196377
PM10	0.188522	0.188522	0.188522	0.199314	0.229841	0.188522	0.188522
PM2.5	0.178703	0.178703	0.178703	0.188933	0.217870	0.178703	0.178703
SO_X	0.395341	0.395341	0.395341	0.426581	0.489059	0.395341	0.395341
VOC (HC)	0.069511	0.069511	0.069511	0.196607	0.556090	0.069511	0.069511
CO_2	525	525	525	566	648	525	525
					67140	0.067140	0.067140
					14920	0.014920	0.014920
					00067	0.002996	0.002304
					00189	0.030393	0.023371
					00005	0.000753	0.000579
					00005	0.000723	0.000556
					00005	0.000686	0.000527
SO_X	0.001517	0.000593	0.001166	0.000072	0.000010	0.001517	0.001166
VOC (HC)	0.000267	0.000104	0.000205	0.000033	0.000012	0.000267	0.000205
CO_2	2.013011	0.786694	1.547936	0.095062	0.013859	2.013011	1.547936
CH_4	0.000258	0.000101	0.000198	0.000011	0.000001	0.000258	0.000198
N_2O	0.000057	0.000022	0.000044	0.000003	0.000000	0.000057	0.000044

Notes:
1.) The dredge type, engine type, horsepower, and fuel type were based on information provided by project sponsors.
2.) The engine load factors for the dredges and support equipment were determined from Table 5-2 of the EPA Report "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data", February 2000.

The following assumptions applied to the load factor determination during dredging operations:
3.) The generic large hopper dredge was assumed to utilize a 0.8 load factor for all of the engines based on the specific operation for each engine type (e.g. propulsion, dredge pumps, and auxiliary).
4.) The propulsion engines on the support equipment vessels were assumed to operate at intermittent times during the dredging operations and were also determined to operate at the 0.4 "slow cruise" load factor.
5.) The secondary engines on the support equipment were assumed to be auxiliary engines that operate sparingly during support equipment operations and were determined to operate at the 0.2 "maneuvering" load factor.

6.) The emission factors were calculated according to the algorithm table and formulas detailed on page 5-3 of the EPA report. The emissions rate formula and algorithm table are also shown on Table A-4, "Marine Engine Emission Factor and Fuel Consumption Algorithms".
10.) The Emission Rate in tons/hr is based on the following formula: Emission Rate = hp*LF*EF*(0.0022046 lbs/gram)*(1 ton/2000 lbs).

Table 5. Assumptions for Marine Equipment Engine HP, Load Factor, and Hours of Operation - Hopper Dredging Vessels
Bayou Casotte Harbor Channel Improvements Project

Activity	Equipment Type	Quantity	Total Installed Power (hp)	Engine Type	Engine Fuel Type	Engine Load Factor	Engine hp (hp)	Hours of Operation per day (hr/day)	Total Days of Active Dredging (days)	Total Engine Hours of Operation (hrs)
Dredge	Generic Large Hopper Dredge	2	9,395	Propulsion	Diesel	0.8	4,350	20	335	13400
				Dredge Pump(s)	Diesel	0.8	1,700	20	335	13400
				Auxiliary	Diesel	0.8	3,345	24	335	16080
	Crew/Survey Boat (Runabout)	1	250	Propulsion	Diesel	0.4	381	20	335	6700
				Auxiliary	Diesel	0.2	97	20	335	6700
Mobilization / Demobilization	Generic Large Hopper Dredge	2	9,395	Propulsion - Oceangoing	Diesel	0.8	4,350	24	4	192
				Auxillary - Oceangoing	Diesel	0.8	3,345	24	4	192
Total Engine Hours for all Phases										56,664

Notes:
1. Total cycle time for Hopper Dredge is assumed to be 81 minutes and hopper dredge downtime is assumed to be 15%.
   Minute break-down of hopper dredge cycle is as follows:
   - Load time with dredge pumps on is 45 minutes.
   - Propulsion engine operate continously during entire cycle time of 81 minutes.
   - Bottom dumping without pumpout pumps takes 5 minutes.
   - Auxillary engines operate continuously, 24 hours per day.
2. Mobilization/Demobilization of Hopper is assumed to be 4 days total.
3. Hopper Dredge engine horsepower breakdown is based on specification for Great Lakes Dredge & Dock Company "Sugar Island Trailing Suction Hopper Dredge" with 3,600 yd^3 hopper capacity and total installed power of 9,395 hp. Specification is available at http://www.gldd.com/upload/zip/fleet/SUGAR_ISLAND_FLEET_SHEET.pdf.
4. Support equipment vessel (i.e. crew boat and shripm boat) engine horsepower break-down based on main engine and auxiliary engine data found in Table 3.1 and Table 3.2 of Starcrest Consulting Group's *Port of Los Angeles Baseline Air Emissions Inventory - 2001* , prepared for the Port of Los Angeles, July 2005.
   Available online at http://www.portoflosangeles.org/DOC/REPORT_Final_BAEI.pdf.

Table 6. Marine Equipment Estimated Emissions - Hopper (tons)
Bayou Casotte Harbor Channel Improvements Project

Pollutant	Dredge					Mobilization / Demobilization		Total Phase Emissions
	Generic Large Hopper Dredge			Crew/Survey Boat		Generic Large Hopper Dredge		
	Propulsion Oceangoing	Dredge Pump(s)	Auxillary - Dredging	Propulsion	Auxiliary	Propulsion - Oceangoing	Auxiliary - Oceangoing	
CO	40.14	15.69	37.04	1.76	0.45	0.58	0.44	96.09
NOX	407.26	159.16	375.81	9.19	1.27	5.84	4.49	963.01
PM	10.09	3.94	9.31	0.23	0.03	0.14	0.11	23.88
PM10	9.69	3.79	8.94	0.22	0.03	0.14	0.11	22.92
PM2.5	9.19	3.59	8.48	0.21	0.03	0.13	0.10	21.73
SOX	20.32	7.94	18.75	0.48	0.07	0.29	0.22	48.08
VOC	3.57	1.40	3.30	0.22	0.08	0.05	0.04	8.66
CO_2	26,974	10,542	24,891	637	93	386	297	63,820
CH_4	3.45	1.35	3.18	0.08	0.01	0.05	0.04	8.16
N_2O	0.77	0.30	0.71	0.02	0.002	0.01	0.008	1.81
CO_2e	27,285	10,663	25,177	644	94	391	301	64,554

Table 7. Marine Equipment Emission Factors and Emission Rates - Multi-Purpose Construction Vessel
Bayou Casotte Harbor Channel Improvements Project

	Dredge		Mob/Demob Towing	
	Generic Large Hopper Dredge		Generic Large Hopper Dredge	
	Propulsion Oceangoing	Auxiliary - Oceangoing	Propulsion - Oceangoing	Auxiliary - Oceangoing
hp	400	120	400	120
Fuel Type	Diesel	Diesel	Diesel	Diesel
Load Factor	0.8	0.8	0.8	0.8
Age Factor	-	-	-	-

Emission Factors (Gram/hp-hr)

CO	0.780934	0.780934	0.780934	0.780934
NO_X	7.923056	7.923056	7.923056	7.923056
PM	0.196377	0.196377	0.196377	0.196377
PM10	0.188522	0.188522	0.188522	0.188522
PM2.5	0.178703	0.178703	0.178703	0.178703
				341
				511
				5
				140
				920

				083
				838
				021
				020
				019
SO_X	0.000139	0.000042	0.000139	0.000042
VOC (HC)	0.000025	0.000007	0.000025	0.000007
CO_2	0.185104	0.055531	0.185104	0.055531
CH_4	0.000024	0.000007	0.000024	0.000007
N_2O	0.000005	0.000002	0.000005	0.000002

Notes:
1.) The dredge type, engine type, horsepower, and fuel type were based on information provided by project sponsors.
2.) The engine load factors for the dredges and support equipment were determined from Table 5-2 of the EPA Report "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data", February 2000.

The following assumptions applied to the load factor determination during dredging operations:
3.) The generic large hopper dredge was assumed to utilize a 0.8 load factor for all of the engines based on the specific operation for each engine type (e.g. propulsion, dredge pumps, and auxiliary).
4.) The propulsion engines on the support equipment vessels were assumed to operate at intermittent times during the dredging operations and were also determined to operate at the 0.4 "slow cruise" load factor.
5.) The secondary engines on the support equipment were assumed to be auxiliary engines that operate sparingly during support equipment operations and were determined to operate at the 0.2 "maneuvering" load factor.

The following assumptions applied to the load factor determination during ocean-going (mobilization/demobilization) operations:
6.) The generic large hopper dredge was assumed to utilize a 0.8 load factor for propulsion and auxiliary engines.
7.) The propulsion engines on the support equipment vessels were to operate at the 0.4 "slow cruise" load factor.
8.) The secondary engines on the support equipment were assumed to be auxiliary engines that operate sparingly during support equipment operations and were determined to operate at the 0.2 "maneuvering" load factor.

9.) The emission factors were calculated according to the algorithm table and formulas detailed on page 5-3 of the EPA report. The emissions rate formula and algorithm table are also shown on Table A-4, "Marine Engine Emission Factor and Fuel Consumption Algorithms".
10.) The Emission Rate in tons/hr is based on the following formula: Emission Rate = hp*LF*EF*(0.0022046 lbs/gram)*(1 ton/2000 lbs).

Table 8. Assumptions for Marine Equipment Engine HP, Load Factor, and Hours of Operation - Multi-Purpose Construction Vessel
Bayou Casotte Harbor Channel Improvements Project

Activity	Equipment Type	Quantity	Total Installed Power (hp)	Engine Type	Engine Fuel Type	Engine Load Factor	Engine hp (hp)	Hours of Operation per day (hr/day)	Total Days of Operation (days)	Total Engine Hours of Operation (hrs)
Centerline Relocatio	Multi-Purpose Construction Vessel	1	520	Propulsion - Oceangoing	Diesel	0.8	400	12	12	144
				Auxiliary - Oceangoing	Diesel	0.8	120	12	12	144
Mobilization / Demobilization	Multi-Purpose Construction Vessel	1	520	Propulsion - Oceangoing	Diesel	0.8	400	12	4	48
				Auxillary - Oceangoing	Diesel	0.8	120	12	4	48
Total Engine Hours for all Phases										384

Notes:
1. Total cycle time for Hopper Dredge is assumed to be 81 minutes and hopper dredge downtime is assumed to be 15%.
   Minute break-down of hopper dredge cycle is as follows:
   - Load time with dredge pumps on is 45 minutes.
   - Propulsion engine operate continously during entire cycle time of 81 minutes.
   - Bottom dumping without pumpout pumps takes 5 minutes.
   - Auxillary engines operate continuously, 24 hours per day.
2. Mobilization/Demobilization of Hopper is assumed to be 4 days total.
3. Hopper Dredge engine horsepower breakdown is based on specification for Great Lakes Dredge & Dock Company "Sugar Island Trailing Suction Hopper Dredge" with 3,600 yd^3 hopper capacity and total installed power of 9,395 hp. Specification is available at http://www.gldd.com/upload/zip/fleet/SUGAR_ISLAND_FLEET_SHEET.pdf.
4. Support equipment vessel (i.e. crew boat and shripm boat) engine horsepower break-down based on main engine and auxiliary engine data found in Table 3.1 and Table 3.2 of Starcrest Consulting Group's *Port of Los Angeles Baseline Air Emissions Inventory - 2001* , prepared for the Port of Los Angeles, July 2005.
   Available online at http://www.portoflosangeles.org/DOC/REPORT_Final_BAEI.pdf.

Table 9. Marine Equipment Estimated Emissions - Multi-Purpose Construction Vessel (tons)
Bayou Casotte Harbor Channel Improvements Project

Pollutant	Dredge		Mobilization / Demobilization		Total Emissions
	Propulsion Oceangoing	Auxiliary - Oceangoing	Propulsion - Oceangoing	Auxiliary - Oceangoing	
CO	0.040	0.012	0.013	0.004	0.069
NOX	0.402	0.121	0.134	0.040	0.698
PM	0.010	0.003	0.003	0.001	0.017
PM10	0.010	0.003	0.003	0.001	0.017
PM2.5	0.009	0.003	0.003	0.001	0.016
SOX	0.020	0.006	0.007	0.002	0.035
VOC	0.004	0.001	0.001	0.000	0.006
CO_2	26.655	7.997	8.885	2.666	46.20
CH_4	0.003	0.001	0.001	0.000	0.006
N_2O	0.001	0.000	0.000	0.000	0.001
CO_2e	27.0	8.1	9.0	2.7	46.73

Table 10. Emission Factors for Employee Vehicles
Bayou Casotte Harbor Channel Improvements Project

Type of Vehicle	Emisson Factor (g/mile)[2]								
	Category[1]	CO	NOx	PM	SO2	VOC	CO2	CH4	N2O
Cars	LDGV[2]	6.4	0.6	0.08		0.23	202	0.015	0.008
Pickups	LDGT1[3]	7.3	1.53	0.12		0.56	216	0.016	0.010

Notes:
1. LDGV=light duty gasoline-fueled vehicles designated for transport of up to 12 people
LDGT1=light duty gasoline-fueled trucks with a gross vehicle weight (GVW) rating of 6000 pounds or less

2. Emission Factors from 40 CFR § 86.1811-01 Emission standards for light-duty vehicles; Table S04–1—Tier 2 and Interim Non-Tier 2 Full Useful Life Exhaust Mass Emission Standards.

3. Emission Factors from § 86.709-99 In-use emission standards for 1999 and later model year light-duty trucks; Table H99–4—Full Useful Life[1] Standards (g/mi) for Heavy Light-Duty Trucks

4. Emission factors estimated from emissions data provided in Climate Action Registry (California Climate Action Registry, 2009).

Table 11. Summary of Employee Vehicles Emissions (tpy)
Bayou Casotte Harbor Channel Improvements Project

Project Year	Type of Vehicle	EPA Category	Daily Vehicles (/day)	Total (VMT)	Travel Days (days/yr)	Annual Travel (VMT/yr)	Annual Emissions5 (tpy)									
							CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC	CO2	CH4	N2O	CO2e
2014	Cars	LDGV	20	250	13	65,000	0.4586	0.0430	0.0057	0.0057	0.0000	0.0165	14.4985	0.00105	0.00057	14.6961
	Superintendent	LDGT1	1	125	26	3,250	0.0262	0.0055	0.0004	0.0004	0.0000	0.0020	0.7742	0.00006	0.00004	0.7866
	Work Truck	LDGT1	1	50	168	8,375	0.0262	0.0055	0.0004	0.0004	0.0000	0.0020	0.7742	0.00006	0.00004	0.7866
						2014 Total Mobile Emission	**0.5109**	**0.0540**	**0.0066**	**0.0066**	**0.0000**	**0.0205**	**16.0470**	**0.0012**	**0.0006**	**16.2694**
2015	Cars	LDGV	20	250	13	65,000	0.4586	0.0430	0.0057	0.0057	0.0000	0.0165	14.4985	0.00105	0.00057	14.6961
	Superintendent	LDGT1	1	125	26	3,250	0.0262	0.0055	0.0004	0.0004	0.0000	0.0020	0.7742	0.00006	0.00004	0.7866
	Work Truck	LDGT1	1	50	168	8,375	0.0262	0.0055	0.0004	0.0004	0.0000	0.0020	0.7742	0.00006	0.00004	0.7866
						2015 Total Mobile Emission	**0.5109**	**0.0540**	**0.0066**	**0.0066**	**0.0000**	**0.0205**	**16.0470**	**0.0012**	**0.0006**	**16.2694**
						Total Mobile Emissions	**1.0217**	**0.1079**	**0.0132**	**0.0132**	**0.0000**	**0.0410**	**32.0940**	**0.0023**	**0.0013**	**32.5388**

Notes:
1. Total VMT is assumed to be 250 miles/day round trip.
2. Annual travel = Daily vehicles * Total VMT * Travel days/yr.
3. Annual emissions = Emission factor * Annual travel * 1lb/453.6 grams * 1ton/2000lb

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DRAFT MEMORANDUM

To:	Amy Dalton, Atkins	**Date:**	December 21, 2011
From:	Wendell Mears, Anchor QEA	**Project:**	110616-01.01
Cc:	Allen Moeller, Port of Pascagoula Kim Fitzgibbons, Atkins Lara Jarrett, Anchor QEA		
Re:	Construction Sequence for Air Quality Analysis, Bayou Casotte Harbor Channel Improvements Project, Pascagoula, Mississippi		

BACKGROUND

The construction sequence for the proposed Port alternatives are very similar and require the excavation, transport, and deposition of the dredged material into the existing Ocean Dredged Material Disposal Site (ODMDS) and the Littoral Zone Disposal Area (LZA). The following estimated volumes, construction methods, and estimated fuel consumptions are based on the cost estimates prepared by the U.S. Army Corps of Engineers, Mobile District (USACE) and, for the navigation aids, the U.S. Coast Guard Aids to Navigation Group Command, New Orleans (USCG). The alternatives and corresponding volumes (cubic yards [CY]) are as follows:

1. Widen 100 feet to the west – 3,390,000 CY; of which 3.7% is sand
2. Widen 50 feet on both sides of the channel – 3,290,000 CY; of which 9.4% is sand

Dredged material that is predominately sand (greater than 70%) will be placed into the LZA. Based on the latest USACE Feasibility Study, given that the Port would not construct until a favorable Section 204(f) decisions is made, construction could start in 3rd quarter 2014 and be completed in the 2nd or 3rd quarter of 2015. This component may change, depending on the USACE feasibility study schedule.

SEQUENCE AND FUEL CONSUMPTION

The USACE cost estimates are based on two 3,800 to 4,000 CY hopper dredges working simultaneously. The anticipated construction time is 12 to 15 months total; with 11 months (335 days) of active dredging for both alternatives. The two dredges are crewed similarly, with 14 men per rotation. The two hopper dredges are attended by one multipurpose vessel for crew change, supplies, and survey. A single medium-duty truck is used at the dock for local trips.

Based on discussions with Great Lakes Dredge and Dock Company and Manson Construction, the crews change at two week intervals; seven to ten private vehicles per dredge transport the crew from their residences to the job site for the estimated 23 crew changes. Most of the crew lives in the Slidell/Hammond, LA regional area 125 miles away. The project superintendent would be traveling to the site on a weekly basis and for purposes of this analysis will accumulate 125 miles per day attributable to the dredging project. There are no land based activities associated with the dredging component. All crew live aboard the dredge or multipurpose vessel when on duty.

The average daily fuel consumptions in gallons per day (GPD) or gallons per shift change, total, and type are as follows:

- Both Dredges = 7,000 GPD; 2,345,000 total; marine diesel
- Multipurpose Survey/Supply/Crew Vessel = 130 GPD; 44,200 total; marine diesel
- Medium Duty Truck = 10 GPD; 3,400 total; gasoline
- Crew Change = 230 gallons per shift change; 5,500 total; gasoline
- Project Superintendent = 5 GPD; 2,000 total; gasoline

The other significant construction feature is constructing the centerline ranges for the first alternative. The USCG estimated that seven marine and one land-constructed centerline range would be relocated if the channel was widened 100-feet to the west. A regional 400 horsepower (HP) multipurpose construction vessel would mobilize to the area and work 12 hour days, removing and reusing the existing lights, signs, and equipment. The old pile clusters would be removed and a new cluster constructed with new materials. Each marine cluster requires 18 hours to demolish, construct, and reuse the existing signs and lights. Based on the USCG estimate, the marine components can be constructed in 12 days on site and 4 days for mobilization and demobilization. Total fuel consumption is estimated to be 6,700 gallons of marine diesel. A land-based crew will remove and reuse the existing tower, signs, and lights. Total fuel consumption is estimated to be 200 gallons of diesel.

For the second alternative, the USCG would accomplish the channel marker relocations as part of their routine patrol, possibly reusing the boards and lighting. It is become common in the USACE, Mobile District/USCG, Eighth District, that the contractor remove and store channel markers as they accomplish the widening. The USCG then establishes the new location on routine missions.

All fuel consumption is based on the alternatives as evaluated by the respective dredging companies for their equipment and automobiles placed in service since 2009. The total HP available versus the portion produced/used by the electro-motive diesel systems was not provided for the dredges and cannot be estimated as it is a combination of dredge configuration and the contractor's means and methods provided in his estimate.

Appendix F

Section 404(b)(1) Evaluation Report

APPENDIX F
BAYOU CASOTTE HARBOR IMPROVEMENT PROJECT
JACKSON COUNTY, MISSISSIPPI
SECTION 404(B)(1) EVALUATION

U.S. Army Corps of Engineers
Mobile District

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Appendix F

Bayou Casotte Harbor Improvement Project
Jackson County, Mississippi
Section 404(b)(1) Evaluation

I. PROJECT DESCRIPTION

a. Location

The Port of Pascagoula is located in southeastern Mississippi on the Mississippi Sound in/adjacent to the City of Pascagoula in Jackson County, Mississippi, south of Interstate Highway 10 and U.S. Highway 90. The Mississippi Sound extends from Lake Borgne, Louisiana to Mobile Bay, Alabama and is geographically separated from the Gulf of Mexico by a series of narrow islands and sand bars. The Bayou Casotte Harbor and Pascagoula River Harbor are accessible via navigation channels that are part of the Pascagoula Navigation Project, which extends approximately 18 miles offshore from the Port. The Pascagoula Navigation Project enters the Mississippi Sound from the Gulf of Mexico, passes between Horn Island and Petit Bois Island, crosses the Gulf Intracoastal Waterway (GIWW) and then branches into two channel segments that provide access to the Bayou Casotte and Pascagoula River harbors. The eastern channel leads to the Bayou Casotte Harbor and the western channel leads to the Pascagoula River Harbor. The proposed project encompasses the Pascagoula Lower Sound and Bayou Casotte channels that extend from the northern limit of Horn Island Pass to the Bayou Casotte Harbor south turning basin.

A study area was defined to represent the area of resources potentially and indirectly affected by the proposed project, shown in Figure 1.7-1 of the EIS. The study area for this EIS is based on and includes:

- Relevant watershed segments established by the U.S. Environmental Protection Agency (EPA) Office of Water (Pointe aux Chenes Bay, Horn Island, Petit Bois Island, and Singing River Island in Mississippi Sound)

- Extent of sediment plumes and effects of local currents (Johnson et al. 2010, Vinogradova 2005)

The project area is a subset of the study area, and is represented by the existing channel footprint and proposed alternatives. The project area defines the area of direct impacts on the resources addressed that may be anticipated as a result of the alternatives, is defined by the areas listed below, and is shown in Figure 1.7-1.

- Pascagoula Lower Sound/Bayou Casotte Federal Navigation Channel segments proposed for widening

- A buffer of 1,000 feet to include Mississippi Department of Environmental Quality (MDEQ) recommendations for mixing zones (750 feet)

- Potential dredged material placement sites
    - LZA site (south and east of Horn Island)
    - Pascagoula ODMDS

b. General Description

This Section 404(b)(1) evaluation addresses discharges of dredged or fill material into waters of the U.S. The proposed action evaluated in this EIS is the dredging of approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment to widen the channel 100 feet parallel to the existing channel centerline, to the existing federally authorized depth of –42 feet MLLW (with allowable over-depth and advanced maintenance excavation consistent with the Preferred Alternative), and the placement of the dredged material resulting from the channel modification (referred to as new work dredged material); this 404(b)(1) evaluation only focuses on the Preferred Alternative (or Alternative 1; EIS Section 2.0).

Alternative 1 (100 feet widening on the west side of the channel) was selected by the Permit Applicant as the Preferred Alternative because it alleviates existing vessel transit restrictions and provides opportunities for beneficial use of dredged material. This alternative meets the purpose and need for the project and will benefit existing facilities that use the channel and/or the Port, such as Chevron Pascagoula Refinery (Chevron Shipping Co.), Mississippi Phosphates Corporation, Signal International, LLC (East yard), VT Halter Marine, Gulf LNG Energy, LLC, First Chemical Corporation.

The Preferred Alternative includes dredging approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal channel segments to widen the channel an additional 100 feet on the west side, parallel to the existing channel centerline, to the existing depth of –42 feet MLLW (with authorized allowable maintenance and overdepth excavation consistent with the Preferred Alternative), and the placement of the approximately 3.39 million cubic yards (mcy) of dredged material as beneficial use and in the ODMDS.

c. Authority and Purpose

The project is needed due to present transit restrictions for vessels greater than 700 feet in length, including daylight-only channel transit, one-way traffic, and wind/current limitations in the Pascagoula Harbor Channel. These vessel restrictions can be alleviated by the proposed widening and resulting improvement in operating conditions and more efficient use of the channel and harbor. The purpose of the Preferred Alternative is to widen the existing Federal Navigation Channel, including excavation via dredge equipment, as needed, to:

- reconfigure the site to alleviate the current transit restrictions and increase travel efficiencies for vessel transit
- maintain or improve the current level of safety for vessel operations under the improved conditions, and

- improve conditions for Port operations

d. General Description of Dredged or Fill Material

(1) General Characteristics of Material

As part of the bulk sediment testing performed for the sediment characterization (EA 2011), the physical characteristics (i.e., grain size, specific gravity, and percent solids) were analyzed. An evaluation of the material type is necessary to evaluate potential placement options (e.g., beneficial use or offshore placement). The Dredged Material Management Plan (Anchor QEA 2012) provides the complete set of bulk sediment physical characteristic data gathered for the evaluation of the new work materials. Almost all information within this 404(b)(1) evaluation is from the DMMP and EIS, unless other sources are cited.

The sediment analyzed from along the Bayou Casotte Channel exhibit high silt and clay fraction (ranges from 70.2 to 97.5 percent). A greater variation is seen in the sediments sampled along the Lower Sound Channel, as the two samples near Horn Island exhibit a sand fraction that is greater than the other sample locations (85 to 91 percent). In general, the geotechnical analyses indicate that the majority of the proposed new work material is silt and clay, with increasing amounts of sand closer to the barrier island chain (Anchor QEA 2012).

In addition, USACE (2011) provided an assessment of the littoral sand transported into the Lower Sound Channel. Littoral sand is defined by the USACE to be material with a sand fraction greater than 70 percent. Borings from two station location intervals along this channel segment encountered littoral sands classified as “poorly graded clean sand” and “silty sand.”

(2) Quantity of Material

The total dredging quantity for Alternative 1 is estimated to be 3.39 mcy (Anchor QEA 2012). This material would result from widening the existing Channel by excavating a 100 foot wide area on the western side. The total length of the dredging area is approximately 7.2 miles from the northern Project limit of the Bayou Casotte Channel to the southern Project limit at the transition between the Lower Sound Channel and the Horn Island Pass. Dredging along the entire channel length would be executed to the project depth (-42 feet MLLW plus 2 feet of advanced maintenance). An allowable overdepth of 2 feet will be used for the proposed dredging activities and is included in the dredging volume (Anchor QEA 2012).

e. Description of the Proposed Discharge

(1) Location

Of the total estimated 3.39 mcy, approximately 125,000 cy would consist of littoral sands that would be utilized for beneficial use at the Littoral Zone Area (LZA) adjacent to Horn Island. The remaining 3.26 mcy is estimated to be silt and clay and would be transported and placed at the Pascagoula Ocean Dredged Material Disposal

Site (ODMDS). The Pascagoula ODMDS is located south of Horn Island, north of the Safety Fairway, and west of the Horn Island Pass Channel.

(2) Size

Both areas proposed for placement are dispersive sites and thus an exact area of discharge is not available at this time; however, the area federally-approved for placement at the Pascagoula ODMDS has an area of approximately 18.5 square nautical miles, with water depths ranging from 38 feet in the northern area to greater than 52 feet in the south (USEPA/USACE 2006).

The LZA is an open water placement site located southeast of Horn Island and to the west of the existing Safety Fairway and the Horn Island Pass. In general, the northeastern portion of the LZA is the shallowest region of the site, and the southwestern region is the deepest. Previous maintenance dredging events in the area have utilized the LZA for sandy material placement. The intent of this site is to keep the sandier sediments in the natural littoral drift along the barrier island coast. The only materials suitable for placement in this site are sands (Anchor QEA 2012).

(3) Type of Site and Habitat

Both sites are dispersive and occur in open water. Direct habitat affected by placement is bay or ocean bottom. For the LZA, coordination with the appropriate State and Federal agencies (Mississippi Department of Marine Resources [MDMR] and National Marine Fisheries Service [NMFS]) will be necessary to evaluate placement location(s) within the LZA, since a portion of the LZA may continue to be affected by a critical habitat designation for the Gulf Sturgeon, within one mile of Horn Island (Anchor QEA 2012).

(4) Time and Duration of Discharge

Estimated construction start date is late 2014 to early 2015, with the project life lasting 50 years. It should be noted that the majority of the project life is associated with maintenance of the channel which would be handled by USACE Planning Division under the 204(f) Federal Assumption of Maintenance process being evaluated in the parallel USACE Civil Works EIS.

f. Description of Disposal Method

Dredging activities for the Preferred Alternative would be performed via one of three options: hopper, mechanical, or hydraulic cutterhead dredge. The length of pipeline required for the hydraulic cutterhead dredging may preclude this method from for some portion of the work (Anchor QEA 2012).

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope

Since both placement areas are dispersive sites, any mounding heights, elevation, and slope created by placement would be temporary.

(2) Sediment Type

The sediment analyzed from along the Bayou Casotte Channel exhibit high silt and clay fraction (ranges from 70.2 to 97.5 percent). A greater variation is seen in the sediments sampled along the Lower Sound Channel, as the two samples near Horn Island exhibit a sand fraction that is greater than the other sample locations (85 to 91 percent). In general, the geotechnical analyses indicate that the majority of the proposed new work material is silt and clay, with increasing amounts of sand closer to the barrier island chain (Anchor QEA 2012).

(3) Dredged/Fill Material Movement

At the Pascagoula ODMDS, the tide and flow conditions are substantial enough to cause erosion and off-site dispersion of the placed material. The site's "dispersiveness" and the associated capacity has not been determined; however, the anticipated dredging quantities are not expected to exceed the site's limit (Anchor QEA 2012).

At the LZA, placing the coarse dredged material (sands in this case) in the LZA directly affects beach accretion. The sediments will be transported by the tidal currents to the nearshore areas of Horn Island and replenish sediment loss in areas along the shoreline (Anchor QEA 2012).

(4) Physical Effects on Benthos

Some benthic fauna would be adversely affected by placement of materials. Benthic faunal recolonization of areas impacted by dredging and dredged material disposal can occur through vertical migration of buried organisms through the dredged material, immigration of postlarval organisms from the surrounding area, larval recruitment from the water column, and/or sediments slumping from the side of the dredged area (Bolam and Rees 2003, Newell et al. 1998).

(5) Other Effects

None known.

(6) Actions Taken to Minimize Impacts

This project was fully coordinated with State and Federal resource agencies, and their comments have been incorporated into the development of the project to the maximum extent practicable. During construction, proper BMPs would be implemented to minimize impacts. Currently, the Preferred Alternative would not result in loss of wetlands.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water

Minimal effects are expected from the Preferred Alternative on water exchange and inflows. There will be no changes to the amount of freshwater inflows in the project area. These changes are expected to be minor in the context of the overall project area and the most concentrated effects being in the immediate Bayou Casotte area. Overall, no significant adverse impacts on the hydrodynamics of Mississippi Sound are expected due to the primary influences of tides, winds, and salinity from the Gulf in the study area.

(a) Salinity

The effect of channel widening would thus slightly reduce the time required for salinity levels to approach normal after a period of heavy rain. This can be expected to increase the long-term average salinity in the Sound by some amount, although such a change would be small and very difficult to detect with the types of monitoring that currently exist. A detailed numerical modeling process would be required to quantify this small effect. A suitable 3-D modeling project could quantify the changed response time associated with simulated inflow events. The channel widening would have little effect on salinity concentrations in dry periods because the salinity gradient would be small (the Sound would already have salinity concentrations close those of the Gulf of Mexico) and the density current would be very small.

(b)Water Chemistry

Based on elutriate sampling (USACE 2010), the Preferred Alternative is expected to result in un-ionized ammonia values that exceed both the chronic (0.035 mg/L) and acute (0.233 mg/L) guidance criteria levels used in the Bayou Casotte TMDL (EPA 2007). The TMDL guidance criteria were in turn based on saltwater criteria for ammonia that were originally established by EPA (1989). Results from elutriate testing from the channel indicated the highest ammonia concentrations were 0.33 mg NH_3/L, 42 percent higher than the acute effects level.

Dilution of sediment port waters with a water volume 1.7 times greater would reduce ammonia concentrations to below acute criteria. For chronic criteria, pore water ammonia values (0.33 mg NH_3/L) would be compared to the chronic criteria threshold of 0.035 mg NH_3/L. The highest pore water ammonia level sampled was approximately 9.4 times higher than the chronic criteria levels of 0.035 mg NH3/L (EPA 1989). Therefore, if the total volume of pore water has ammonia levels similar to the highest concentration sampled, the chronic criteria threshold would be exceeded in overlying waters only if the pore water volume was mixed with less than ten times its own volume.

Modeling results conducted as part of the Section 103 Evaluation for this project, indicated a 318-fold dilution of full strength elutriate concentration would be expected within 4-hours following placement of dredged material at the ODMDS and is more than adequate for meeting guidance criteria levels in the Bayou Casotte TMDL) for both ammonia and dissolved cyanide. The 318-fold dilution of the elutriate concentrations is expected within 4-hours of placement of dredged material at the ODMDS and provides more than adequate dilution to achieve guidance criteria levels for dissolved cyanide (Anchor QEA 2012).

Other nutrient levels are expected to remain within safe and would also be expected to be both localized and temporally-limited. The absence of correlation between depth and nutrient levels suggests that an increase in depth in the project area will not lead to permanent effects on nutrient levels in bottom waters.

In keeping with the language and intent of the State of Mississippi Antidegradation Implementation Methods (MDEQ 2010) the proposed activity will not cause water quality to be "…degraded below (or above) the base levels set forth in these standards for the protection of the beneficial uses…". The conclusion as to the lack of degradation is based on a comparison of the appropriate existing water quality standard, elutriate concentrations of the same parameter(s), and the amount of dilution of sediment porewaters expected to occur at the disposal site.

(c) Clarity

There may be some temporary and localized increases in turbidity during excavation operations. Water clarity is expected to return to normal background levels shortly after operations are completed.

Effects on TSS are anticipated to be temporary and would be mostly restricted to periods of dredging operations. BMPs would be implemented to control turbidity by keeping it to minimum and within the immediate dredging area. Data do not indicate a correlation between TSS levels and depth therefore increasing the depth of the channel in these areas is not expected to permanently impact TSS levels.

(d) Color

Water immediately surrounding some construction areas (i.e. where dredging or fill placement would occur) may become discolored temporarily due to disturbance of the sediment. BMPs would be implemented to reduce and control turbidity during construction and material placement.

(e) Odor

Portions of the material may be anoxic, and temporary and localized sulfidic odors could occur during operations.

(f) Taste

No detectable impact to the environment is expected.

(g) Dissolved Gas Levels

No detectable impact to the environment is expected. The project would not create conditions that would cause an increase in dissolved gas levels (e.g., increased solar gain, increased aeration, or additional nutrient loading).

(h) Nutrients

Project implementation would not create conditions that would increase nutrient loading and no detectable negative impact is expected. Information regarding nutrients and water quality is discussed previously in Part II b (1) (b).

(i) Eutrophication

Project implementation would not create conditions that would increase nutrient loading and eutrophication is not expected.

(j) Others as Appropriate

None known.

(2) Current Patterns and Circulation

The Preferred Alternative would provide a wider navigation channel that would result in an increased amount of tidal exchange with the Gulf than current conditions.

(a) Current Patterns and Flow

Circulation patterns in the project area are driven by astronomical tides, winds, and to a lesser degree, freshwater discharge (Orlando, et al., 1993, Seim, et al, 1987). The Mississippi Sound has substantial openings in the barrier island system.

The proposed 100-foot widening of the Pascagoula Lower Sound and Bayou Casotte Channel in the Sound will not increase the existing width of Horn Island Pass. The placement of dredged material in the designated LZA located east and south of Horn Island and placement of the remainder of the material (approximately 3.3 mcy) at the Pascagoula ODMDS south of Horn Island will also not affect Horn Island Pass.

In theory, any increase in the opening between the Gulf of Mexico and Mississippi Sound would allow more water to pass on each tidal cycle, resulting in greater tidal amplitude and tidal currents. However, with no change in the barrier island opening, no significant change or adverse impacts to tides or tidal currents would be expected. With no change in the barrier island opening, no change in storm surge propagation potential would be expected.

(b) Velocity

Channel widening is not expected to increase velocities by large magnitudes.

(c) Stratification

Waters in this portion of Mississippi Sound are stratified, (i.e. lower density freshwater flows across the top of higher density saline waters at the bottom of the channel) and fresh and salt water mix only in a transition zone. Adverse impacts in the freshwater-saltwater mixing zone in this stratified system are not anticipated.

(d) Hydrologic Regime

Although the Preferred Alternative may increase tidal exchanges, hydrologic and tidal regimes would not be altered on a large scale.

(3) Normal Water Level Fluctuations

The average water surface elevation through most of the study area would largely be unaffected by the Preferred Alternative, and no significant increase in tidal amplitude would be expected.

(4) Salinity Gradients

The existing openings between the barrier islands are substantial and there are existing deeper navigation channels between the barrier islands. Consequently, Mississippi Sound tends to have salinities that are strongly influenced by the Gulf of Mexico. For example, EPA water quality monitoring from 2000 to 2004 for the study area, including Pascagoula to the Gulf, produced an average salinity of 25.29 ppt (EPA 2011). With Mississippi Sound salinity averaging 25 ppt, the salinity difference between the Port of Pascagoula and the Gulf of Mexico must be even smaller during low inflow periods.

Effects of salinity with respect to dredging projects are generally in terms of the deepening of a channel. Channel deepening will allow a salt water wedge to propagate further upstream and move the salinity freshwater interface in the water column. The higher location of this interface in the water column will mean that more saltwater will mix with freshwater during ship passage (note that ship passage mixes water due to displacements and movements of water from the ship itself and the propeller). Widening a channel would not have any influence of the location of the saltwater freshwater interface and would not change the amount of mixing from the passage of a ship.

Without an increase in depth, the density current strength would not change, but would be extended by the additional channel width. However, while the channel bottom width would increase by approximately 30 percent, that width increase represents a very small portion of Mississippi Sound width. While the density current in the Sound is not as strong as in the deeper navigation channel, it is acting over tens of thousands of feet of width and mixes much more water than the navigation channel.

(5) Actions that Will Be Taken to Minimize Impacts

In addition to alternatives analyses and planning and coordination with state and federal agencies, fill placement areas will be located to avoid impacts to various resources such as threatened and endangered species habitat, cultural resources, or seagrasses. One beneficial use placement area, the LZA, is a site for replenishing sands of study area barrier islands. BMPs will be implemented during construction activities.

c. Suspended Particulate/Turbidity Determination

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site

An increase in suspended particulates and the concomitant turbidity levels may occur during placement operations. These are temporary and localized events, and appropriate BMPs would be implemented; however, both placement areas are dispersive by design.

(2) Effects on Chemical and Physical Properties of the Water Column

(a) Light Penetration

Turbidity levels will be temporarily increased during placement operations. These are temporary and localized events, and appropriate BMPs would be implemented.

(b) Dissolved Oxygen

State standards for DO require that a daily average from a sample location should not fall below 5.0 mg/L, and that instantaneous readings should not fall below 4.0 mg/L (MDEQ 2007). Additionally, it is recommended (MDEQ 2007) that the measurement depth be determined based on where stratification layers (whether from temperature or salinity) exist. For those coastal waters which are stratified, DO measurements should be collected when possible from the mid-depth of the epilimnion if the epilimnion depth is 10 feet or less or at 5 feet from the water surface if the epilimnion depth is greater than 10 feet (MDEQ 2007). Based upon these guidelines, the MDEQ criteria do not require DO measurements from the bottom waters, in part because existing guidance (MDEQ 2007) is to measure DO levels in the water mass of stratified waterbodies (the surface layer) where DO levels would be highest, while not sampling in the water mass (the bottom layer) where problematic levels of DO most commonly occur. Effects on DO levels in shallow waters are for the most part expected to be minor and temporary. Temporary effects of the dredging operations will be limited to the mixing of water with bottom sediments, resulting in increased chemical and biological oxygen demand (USACE 2010).

(c) Toxic Metals and Organics

Five instances were found where arsenic in sediments exceeded Threshold Effects Levels (TEL) ranging between a factor of 1.1 and 1.5 (Table 3-2 in Anchor QEA 2012); however, arsenic levels never exceeded Probable Effects Level (PEL) guidance criteria.

Bioaccumulation evaluation was performed with two test organisms, the sand worm (*Nereis virens*) and the blunt-nose clam (*Macoma nasuuta*). Survival rates did not differ between organisms or between dredged and reference sites (Anchor QEA 2012). Tissue concentrations of arsenic, copper, and lead from these test organisms were tested against EPA "Action Levels" and also EPA Region 4 "background tissue concentration" data. None of the metals concentrations in tissues exceeded FDA Action Levels, but lead levels in clams exceeded concentrations in the EPA Region 4 background tissue concentration data set. The lead content of clam tissues raised on sediments from the areas to be dredged was also higher than for clams raised on sediments from the reference site (Anchor QEA 2012).

Prior to placement of dredge material, concurrence by the US EPA is needed as to whether or not these findings meet guidance for the Limiting Permissible Concentration (LPC) for lead in sediments.

(d) Pathogens

None expected or found.

(e) Aesthetics

The project has been designed and selected in coordination with resource agencies to avoid detrimental environmental impacts and reduce or eliminate adverse aesthetic qualities. Placement at the LZA would contribute to barrier island development, which increases the area aesthetics.

(f) Others as Appropriate

None known.

(3) Effects on Biota

No impacts are expected on photosynthesis, suspension/filter feeders, and sight feeders, except for direct and temporary impacts from fill placement (e.g. burial of benthos or temporary increase of local turbidity levels).

(4) Actions Taken to Minimize Impacts

In addition to alternatives analyses and planning and coordination with state and federal agencies, fill placement areas will be located to avoid impacts to various resources such as threatened and endangered species habitat, cultural resources, or seagrasses. One beneficial use placement area, the LZA, is a site for replenishing sands of study area barrier islands. BMPs will be implemented during construction activities.

d. Contaminant Determinations

Levels of PAH and PCB congeners in sediments did not exceed TEL guidance criteria for any samples within Bayou Casotte (Anchor QEA 2012).

Effects on chlorinated pesticides are expected to possibly exceed EPA chronic criteria levels during dredging operations due to water column mixing for 4,4'-DDT, endrin, and heptachlor. Detection of 4,4'-DDD, alpha-BHC, beta-BHC, dachtal, delta- BHC, gamma-BHC, and methoxychlor can also be expected, although levels of these chlorinated pesticides are not expected to exceed EPA chronic level criteria. There is expected to be no permanent effects to any of the above listed organic contaminants once dredging operations are complete.

Bioaccumulation evaluation was performed with two test organisms, the sand worm (*Nereis virens*) and the blunt-nose clam (*Macoma nasuuta*). These two organisms were exposed to sediments from the area to be dredged (test area) for 28 days, and their survival rates and mean tissue concentrations were compared to results from laboratory controls and sediments from a reference site (with no evidence of contamination). Survival rates for individuals grown on sediments from the test did not display survival rates different from controls or reference sites (Anchor QEA 2012). Tissue samples from these organisms were compared to FDA "Action Levels" as well as Toxicity Equivalency Quotient (TEQ) criteria. Also, values were tested against the EPA Region 4 "background tissue concentration" dataset. No samples exceeded US Food and Drug Administration Action Level criteria, but dioxin TEQ values for both worms and clams exceeded EPA background concentrations in both test and reference sites. Anchor QEA (2012) found that the exceeded dioxin TEQ values for organisms on the reference site sediments were attributable to the least toxic congener, indicating minimal likelihood of adverse impacts of dioxin congeners in sediments. Prior to placement of dredge material, concurrence by the EPA is needed as to whether or not these findings meet guidance for the LPC for dioxin congeners in sediments.

The USACE tested sediments for 46 SVOCs, of which five [bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, diethyl phthalate, di-n-butyl phthalate, and phenol] were detected at low concentrations in sediment samples from areas to be dredged. In comparison, there were no SVOCs detected at either of the reference sites. One of the 46 SVOCs [bis(2-ethylhexyl) phthalate] has a TEL and PEL value for comparison and one of the detected concentrations of bis(2-ethylhexyl) phthalate (at BCW-05) was above the TEL criteria (USACE 2011). The TEL this phthalate compound exceeded TEL criteria by a factor of 2.4 (Anchor QEA 2012). There was no detection (thus no exceedance) of existing criteria for butylins in sediments (Anchor QEA 2012). Prior to placement of dredge material, concurrence by the EPA is needed as to whether or not these findings meet guidance for the LPC for SVOC in sediments.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton

Construction and placement operations are expected to have only minor temporary, local impacts on plankton from potential increased turbidity levels.

(2) Effects on Benthos

Some benthic fauna would be adversely affected by placement of materials. Benthic faunal recolonization of areas impacted by dredging and dredged material disposal can occur through vertical migration of buried organisms through the dredged material, immigration of postlarval organisms from the surrounding area, larval recruitment from the water column, and/or sediments slumping from the side of the dredged area (Bolam and Rees 2003, Newell et al. 1998).

(3) Effects on Nekton

Construction and placement operations are expected to have only minor temporary, local impacts on nekton from potential increased turbidity.

(4) Effects on Aquatic Food Web

Turbidity from total suspended solids (TSS) tends to interfere with light penetration and thus reduce photosynthetic activity by phytoplankton and algae (Wilber and Clarke 2001). Reduced light penetration due to turbidity may have a short term impact on zooplankton populations since they feed on the phytoplankton. Such reductions in primary productivity would be localized around the immediate area of the dredging and placement operations and would be limited to the duration of the plume at a given site. Conversely, the decrease in primary production, presumably from decreased available light, has been found to be offset by an increase in nutrient content which are released into the water column during dredged material placement activities (Morton 1977, Newell et al. 1998). These nutrients may act to enhance the area surrounding the dredging activities increasing productivity. Appropriate BMPs would be implemented to minimize or avoid detrimental effects to aquatic trophic dynamics.

(5) Effects on Special Aquatic Sites

According to NOAA (2011), approximately 652 acres of seagrass (or Submersed Aquatic Vegetation [SAV]) occurs on the study area's barrier islands' north shorelines. No SAV appears to occur within the Preferred Alternative footprint, the LZA, or Pascagoula. No direct impacts associated with construction are anticipated.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determination

Placement areas are dispersive and may require mixing zones. The site's "dispersiveness" and the associated capacity has not been determined; however, the anticipated dredging quantities are not expected to exceed the site's limit (Anchor QEA 2012). Coordination with EPA regarding dilutions and mixing of material is part of this project implementation process.

(2) Determination of Compliance with Applicable Water Quality Standards

Sediment analyses of material have been performed. Where necessary, prior to placement of dredge material, concurrence by the EPA is needed as to whether or not these findings meet guidance for the LPC for SVOCs, dioxin congeners, and lead. Mississippi Department of Environmental Quality has been part of project coordination and a Joint Application and Notification for water quality standards review has been submitted.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply

No water wells occur within the project footprint, and no impacts to water supplies are expected.

(b) Recreational and Commercial Fisheries

During dredging and placement, some areas may be excluded from recreational activities temporarily and locally.

(c) Water-related Recreation

The Preferred Alternative would improve navigation, which may improve water-related recreation.

(d) Aesthetics

The Preferred Alternative is designed to minimize any adverse impacts to the environment and includes placement of littoral sands to develop and restore barrier islands.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

No parks, national and historic monuments, national seashores, wilderness areas, or research sites will be negatively impacted by the Preferred Alternative.

It should be noted that an archaeological (burial) site occurs on Horn Island and is currently eroding (Section 4.17.2). If the Preferred Alternative is constructed, mitigation measures may be implemented. Any mitigative measures undertaken should be developed through a Memorandum of Agreement between the MDAH, the USACE and the Advisory Council for Historic Preservation. According to the USACE Mobile District, there is not currently an MOA or formal burial treatment plan in place. Any mitigative measures undertaken should be developed through a Memorandum of Agreement between the MDAH, the USACE and the Advisory Council for Historic Preservation. According to the USACE Mobile District, there is not currently an MOA or formal burial treatment plan in place. Therefore, possible mitigative measures may include, but are not limited to:

- Armoring along the adjacent shoreline.
- Phase III work being completed during the construction phase of the project if the archaeological site cannot be avoided (Grunewald 2012).
- Determining whether the shipwreck of the Sea Bee is located within the proposed project footprint.

Additional analysis of impacts from the mitigative actions would be conducted as appropriate.

g. Determination of Cumulative Effects on the Aquatic Ecosystem

Cumulative impacts due to past, current, and reasonably foreseeable future projects (1–3 years) in concert with the proposed project are not anticipated to have significant adverse impacts to environmental resources within the project area. The majority of environmental impacts associated with the projects discussed in Sections 5.2 and 5.3 will be temporary, and in most cases result in beneficial impacts to the region. One of the long-term cumulative impacts associated with the listed projects will be increased economic opportunity in terms of the number of jobs and stimulus to the local economy.

Several of the projects included in the cumulative impact analysis involve dredging, some involving maintenance dredging, which result in temporary impacts such as increased turbidity, air emissions and long-term impacts to the harbor bottom. Widening of existing channels to depths of 19.2 feet or greater (depth of existing channel) would cause the conversion of shallow silty clay bottom habitat to less productive deeper habitat that most likely will be hypoxic with dissolved oxygen levels below 2 mg/L. Dredging associated with the evaluated projects may result in adverse water quality and sediment conditions because of low concentrations of some contaminants already in the shipping channel sediments, but are not anticipated to be toxic to aquatic organisms.

The proposed project has the potential to adversely impact known cultural resource sites, if not properly mitigated; coordination with the SHPO is ongoing. Dredging operations associated with listed projects would primarily occur in previously disturbed areas, and thus pose limited potential for cumulative impact to cultural resources. Dredged material placement on the Greenwood Island disposal site would require additional mitigation to preserve Mexican war burial sites.

Existing governmental regulations will address the issues which influence local and ecosystem-level conditions. Natural resources in the area are provided protection through coordination with stakeholder groups, local organizations, and State and Federal regulatory agencies implementing regulations such as the Clean Water Act and the Clean Air Act (Section 11). This collaboration and regulation of impacted resources should prevent or minimize negative impacts which could threaten the health and sustainability of the region.

h. Determination of Secondary Effects on the Aquatic Ecosystem

No adverse significant secondary effects on the aquatic ecosystem should occur as a result of the Preferred Alternative. Secondary effects on the aquatic ecosystem are expected to be beneficial due to beneficial use of littoral sands.

REFERENCES

Anchor QEA. 2012. Dredged Material Management Plan for the Bayou Casotte and Lower Sound Channel Widening Project. Prepared for Jackson County – Port of Pascagoula.

Bolam, S.G. and H.L. Rees. 2003. Minimizing impacts of maintenance dredged material disposal in the coastal environment: a habitat approach. Environmental Management. Vol. 32, No. 2.

Buchman, M.F. 2008. NOAA Screening Quick Reference Tables. NOAA Office of Response and Restoration, Report 08-01. Seattle WA. http://response.restoration.noaa.gov/book_shelf/122_NEW-SQuiRTs.pdf.

EA Engineering, Science, and Technology, Inc. (EA), 2011. Evaluation of Dredged Material Pascagoula Harbor Federal Navigation Channel Improvements Project, Pascagoula, Jackson County, Mississippi. Draft. Prepared for: USACE Mobile District.

EPA, 2011. National Coastal Assessment Database. http://oaspub.epa.gov/coastal/coast.search. Accessed May 2011.

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Morton, J.W. 1977. Ecological effects of dredging and dredge spoil disposal: a literature review. Technical Papers U.S. Fish and Wildlife Ser. #94

Newell, R.C., L.J. Seiderer, and D.R. Hitchcock. 1998. The impact of dredging works in coastal waters: a review of the sensitivity to disturbance and subsequent recovery of biological resources on the sea bed. Oceanography and Marine Biology: an annual Review. Vol. 36. 127-78.

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USEPA/USACE. 2006. Pascagoula Ocean Dredged Material Disposal Site – Site Management and Monitoring Plan. May 2006.

Wilber, D.H. and D.G. Clarke. 2001. Biological effects of suspended sediments: a review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. North American Journal of Fisheries Management 21:855-875.

Findings of Compliance with
Section 404(b)(1) Guidelines
Bayou Casotte Harbor Improvement Project
Jackson County, Mississippi

1. No significant adaptations of the Guidelines were made relative to the evaluation for this project.

2. The Preferred Alternative is the result of a thorough evaluation of alternatives.

3. The Preferred Alternative will not violate any applicable State or Federal water quality criteria or toxic effluent standards of Section 307 of the Clean Water Act.

4. The Preferred Alternative will not jeopardize the existence of any federally or State-listed threatened or endangered species or their critical habitat or violate any protective measures for any sanctuary. Various resource agencies, including U.S. Fish and Wildlife Service and National Marine Fisheries Service, have been consulted regarding potential issues of any federally or State-listed threatened or endangered species or their critical habitat.

5. The Preferred Alternative will not result in adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. There are no significant adverse impacts expected to the aquatic ecosystem diversity, productivity and stability, or recreational, aesthetic, and economic values.

6. Appropriate steps to minimize potential adverse impacts on the aquatic system include close coordination with State and Federal resource agencies during final design prior to construction to incorporate all valid suggestions.

7. Based on the guidelines, the Preferred Alternative is specified as complying with the requirements of the Section 404(b)(1) guidelines.

____ ____________________

Craig Litteken Date
Chief, Environmental Section
U.S. Army Corps of Engineers, Mobile District

Appendix G

Section 404 Application

JOINT APPLICATION AND NOTIFICATION

U.S. DEPARTMENT OF ARMY CORPS OF ENGINEERS
MISSISSIPPI DEPARTMENT OF MARINE RESOURCES
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY/OFFICE OF POLLUTION CONTROL

This form is to be used for proposed activities in waters of the United States and Mississippi and for the erection of structures on suitable sites for water dependent industry. Note that some items, as indicated, apply only to projects located in the coastal area of Hancock, Harrison and Jackson Counties.

1. Date
4 6 2011
month day year

2. Applicant (mailing address and telephone)
Jackson County Port Authority
P.O. Box 70
Pascagoula, MS 39568-0070
(228)-762-4041

3. Official use only
COE ____
DMR ____
DEQ ____
A95 ____
DATE RECEIVED ____

4. Project location
Street Address N/A City/Community Jackson County, MS
Name of Waterway Pascagoula Lower Sound Channel / Bayou Casotte Channel - Miss Sound
Latitude 30.365 N Longitude (if known) 88.556 W
Geographic location: Section N/A Township N/A Range N/A County Jackson

5. Project description **New work** X **Maintenance work** __

Dredging
X Channel length 7.22 miles width add 100ft West existing depth 42' proposed depth 42'
____ Canal length____ width____ existing depth____ proposed depth____
____ Boat Slip length____ width____ existing depth____ proposed depth
____ Marina length____ width____ existing depth____ proposed depth____
X Other(explain) length____ width____ existing depth____ proposed depth____
100 ft. extension of existing channel on west side of Federal Channel – length of widening is approximately 7.22 miles
Cubic yards of material to be removed 3.35 million CY Type of material mixed sand/silts/ clays
Location of spoil disposal area USEPA Pascagoula ODMDS and possible littoral zone disposal of sands
Dimensions of spoil area As shown on attached drawing Method of excavation hopper/ mechanical/pipeline
How will excavated material be contained? Open Water - not contained

Construction of structures

N/A Bulkhead	Total length____	Height above water____	
N/A Pier	length____	width____	height____
N/A Boat Ramp	length____	width____	slope____
N/A Boat House	length____	width____	height____

N/A Structures on designed sites for water dependent industry (Coastal area only). Explain in item II or include as attachment.
N/A Other (explain)____

Filling
Dimensions of fill area____
Cubic yards of fill____ Type of fill____

Other regulated activities (i.e. Seismic exploration, burning or clearing of marsh) Explain.

6. **Additional information relating to the proposed activity**

Does project area contain any marsh vegetation? Yes___ No_X_______

(If yes, explain)____________________

Is any portion of the activity for which authorization is sought now complete? Yes__________ No_X__

(If yes, explain)____________________

Month and year activity took place_N/A____________________

If project is for maintenance work on existing structures or existing channels, describe legal authorization for the existing work. Provide permit number, dates or other form(s) of authorization.____________________

Has any agency denied approval for the activity described herein or for any activity that is directly related to the activity described herein?

Yes____No_X__(If yes, explain)____________________

7. **Project schedule**

Proposed start date_2013 - 2014____________________Proposed completion date___2014- 2015__________

Expected completion date (or development timetable) for any projects dependent on the activity described herein.

8. **Estimated cost of the project**__$25,000,000____________________

9. **Describe the purpose of this project. Describe the relationship between this project and any secondary or future development the project is designed to support.** The measures proposed would widen the channel north of Petit Bois island to the turning basin located at the mouth of Bayou Casotte. These measures would help to alleviate the current transiting restrictions by providing increased opportunities for vessel transit along with a potential increase in the maximum speed a vessel is allowed to transit, provide improved conditions for vessel operations, provide improved conditions for port operations, and if possible, provide improved habitat conditions through beneficial use of dredged material.

Intended use: Private_X________Commercial_X_____Public___X___Other (Explain)____________________

10. **Describe the public benefits of the proposed activity and of the projects dependent on the proposed activity. Also describe the extent of public use of the proposed project.** The width extension will allow for an easement of the current restrictions that are placed on vessel transiting the harbor. Those restrictions include one way traffic, daylight only movement for vessels transiting with a length greater than 700 feet, and weather related restrictions. The benefits generated will result from time savings due to the congestion within the harbor, and a reduction in transportation costs that result from those delays. Reducing the transportation cost of import and export trade will contribute directly to increases in national net income which is a public benefit. The widened channel area will be available for public marine use.

11. **Narrative Project Description:**

Channel Widening – 100 foot widening of the west side parallel to the existing channel centerline. The improved channel length would be up to 38,137 feet (7.22 miles) long, and new work dredging quantity estimates are approximately 3.35 million cubic yards. The widening project typically results in some easing at the channel bends. One on five channel side slopes are being used for the with project condition as in the existing condition. With channel modification, some US Coast Guard channel beacons and markers will require relocation.

It is anticipated that most of the material associated with the channel improvement measures will be hydraulically excavated by a hopper dredge. A combination of hydraulic pipeline and/or mechanical dredging procedures may need to be incorporated as well. Preliminary results indicate that a small portion of the material is sand and suitable for beneficial use. Therefore, this material will be placed in the littoral zone disposal area, located southeast of the east end of Horn Island. The remaining material will be placed in the USEPA designated Pascagoula ODMDS.

12. **Provide the names and addresses of the adjacent property owners. Also identify the property owners on the plan view of the drawing described in Attachment "A".** (Attach additional sheets if necessary.)

N/A – Open State Waters of the MS Sound

13. **List all approvals or certifications received or applied for from Federal, State and Local agencies for any structures, construction, discharges, deposits or other activities described in this application. Note that the signature in Item 14 certifies that application has been made to or that permits are not required from the following agencies. If permits are not required, place N/A in the space for Type Approval.**

Agency	***Type Approval***	***Application Date***	***Approval Date***
Dept. of Environmental Quality			
Army Corps of Engineers			
City/County N/A			
Other N/A			

14. **Certification and signatures**

Application is hereby made for authorization to conduct the activities described herein. I agree to provide any additional information/data that may be necessary to provide reasonable assurance or evidence to show that the proposed project will comply with the applicable state water quality standards or other environmental protection standards both during construction and after the project is completed. I also agree to provide entry to the project site for inspectors from the environmental protection agencies for the purpose of making preliminary analyses of the site and monitoring permitted works. I certify that I am familiar with and responsible for the information contained in this application, and that to the best of my knowledge and belief, such information is true, complete and accurate. I further certify that I am the owner of the property where the proposed project is located or that I have a legal interest in the property and that I have full legal authority to seek this permit.

Allen Moeller
Signature of Applicant or Agent

06 APR 2011
Date

U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willingly falsifies, conceals, or covers up by any trick, scheme or device a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than five years, or both.

15. **Mississippi Coastal Program (Coastal area only)**

I certify that the proposed project for which authorization is sought complies with the approved Mississippi Coastal Program and will be conducted in a manner consistent with the program.

Allen Moeller
Signature of Applicant or Agent

06 APR 2011
Date

16. Fees

Payable to State of Mississippi
$50.00 Residential
$500.00 Commercial
$50.00 Cost of public notice fee

Please include appropriate fees for all projects proposed in coastal areas of Hancock, Harrison and Jackson counties.

17. If project is in Hancock, Harrison or Jackson Counties, send one completed copy of this application form and appropriate fees listed in Item 16 to:

Department of Marine Resources
1141 Bayview Avenue
Suite 101
Biloxi, MS 39530

If project IS NOT in Hancock, Harrison or Jackson Counties, send one completed copy of this application form to each agency listed below:

District Engineer
Army Engineer
District Mobile
Attn: SAMOP-S
Box 2288
Mobile, AL 36628

District Engineer
U.S. Army Engineer
District Vicksburg
Attn: LMKOD-FE
P.O. Box 60
Vicksburg, MS 39180

Director
Mississippi Dept. of Environmental Quality
Office of Pollution Control
P.O. Box 10385
Jackson, MS 39289

18. In addition to the completed application form, the following attachments are required:

Attachment "A" Drawings

Provide a vicinity map showing the location of the proposed site along with a written description of how to reach the site from major highways or landmarks. Provide accurate drawings of the project site with proposed activities shown in detail. All drawings must be to scale or with dimensions noted on drawings and must show a plan view and cross section or elevation. Use 8 1/2 x 11" white paper or drawing sheet attached.

Attachment "B" Authorized Agent

If applicant desires to have an agent or consultant act in his behalf for permit coordination, a signed authorization designating said agent must be provided with the application forms. The authorized agent named may sign the application forms and the consistency statement.

Attachment "C" Environmental Assessment

Provide an appropriate report or statement assessing environmental impacts of the proposed activity and the final project dependent on it. The project's effects on the wetlands and the effects on the life dependent on them should be addressed. Also provide a complete description of any measures to be taken to reduce detrimental offsite effects to the coastal wetlands during and after the proposed activity. Alternative analysis, minimization and mitigation information may be required to complete project evaluation.

Attachment "D" Variance or Revisions to Mississippi Coastal Program *(Coastal area only)*

If the applicant is requesting a variance to the guidelines in Section 2, Part III or a revision to the Coastal Wetlands Use Plan in Section 2, Part IV of the Rules, Regulations, Guidelines and Procedures of the Mississippi Coastal Program, a request and justification must be provided.

Attachment "A" Drawings

1. Location and Setting

2. Figure 1: Site Vicinity Map

3. Figure 2: Bayou Casotte Harbor Channel Improvement Plan (Overview)

4. Figure 3: Bayou Casotte Harbor Channel Improvement- Bayou Casotte Segment

5. Figure 4: Bayou Casotte Harbor Channel Improvement- Pascagoula Lower Sound Segment

6. Figure 5: Bayou Casotte Harbor Channel Improvements 100 Foot Widening Cross-Sections

7. Figure 6: Bayou Casotte Harbor Channel Improvements 100 Foot Widening Cross-Sections

Location and Setting

The Port of Pascagoula - Bayou Casotte Harbor is located in Jackson County, Mississippi, in the southeastern-most portion of the state along the Gulf of Mexico. It is positioned south of the juncture of Interstate 10 and Mississippi Highway 63. The Port of Pascagoula is accessible from the Gulf of Mexico by a shipping channel located through the pass between Horn Island and Petit Bois Island in the Mississippi Sound. The Horn Island Pass sea buoy marks the entrance to this channel at 30 degrees 11 minutes north and 88 degrees 3 minutes west. The channel proceeds northward crossing the Gulf Intracoastal Waterway (GIWW). Just north of the GIWW the channel splits into an eastern and western fork which leads to Bayou Casotte Harbor and the Pascagoula River Harbor, respectively.

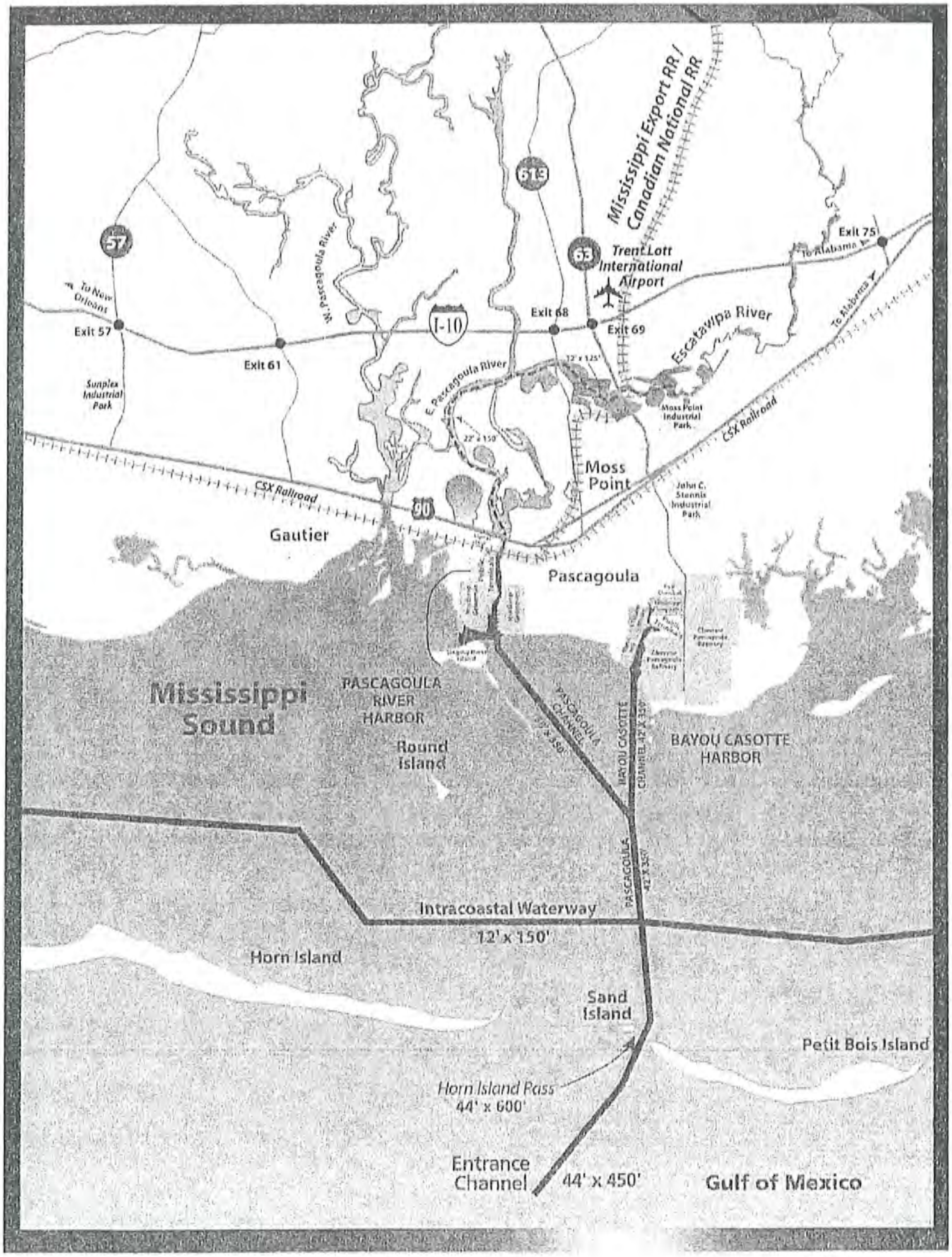
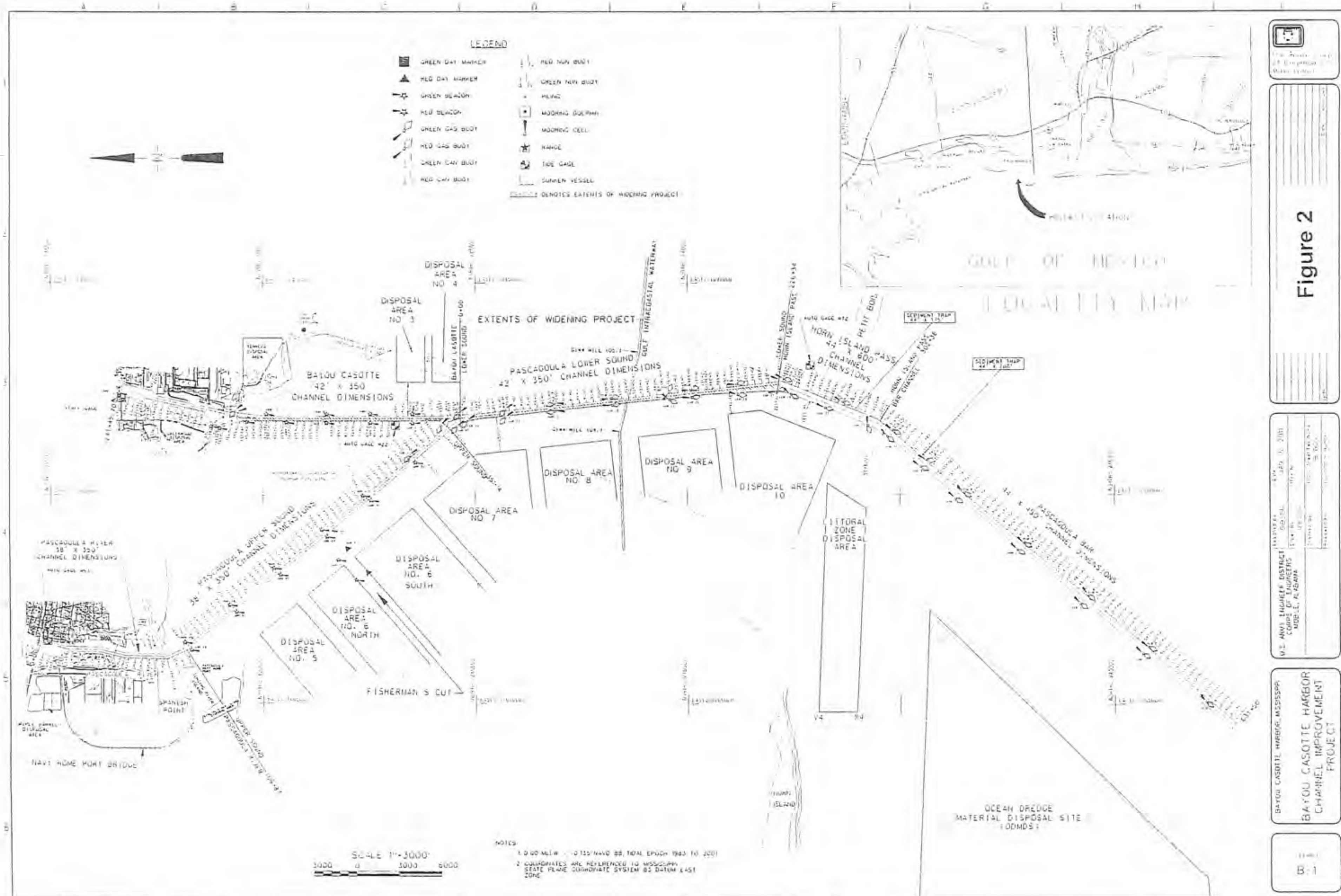
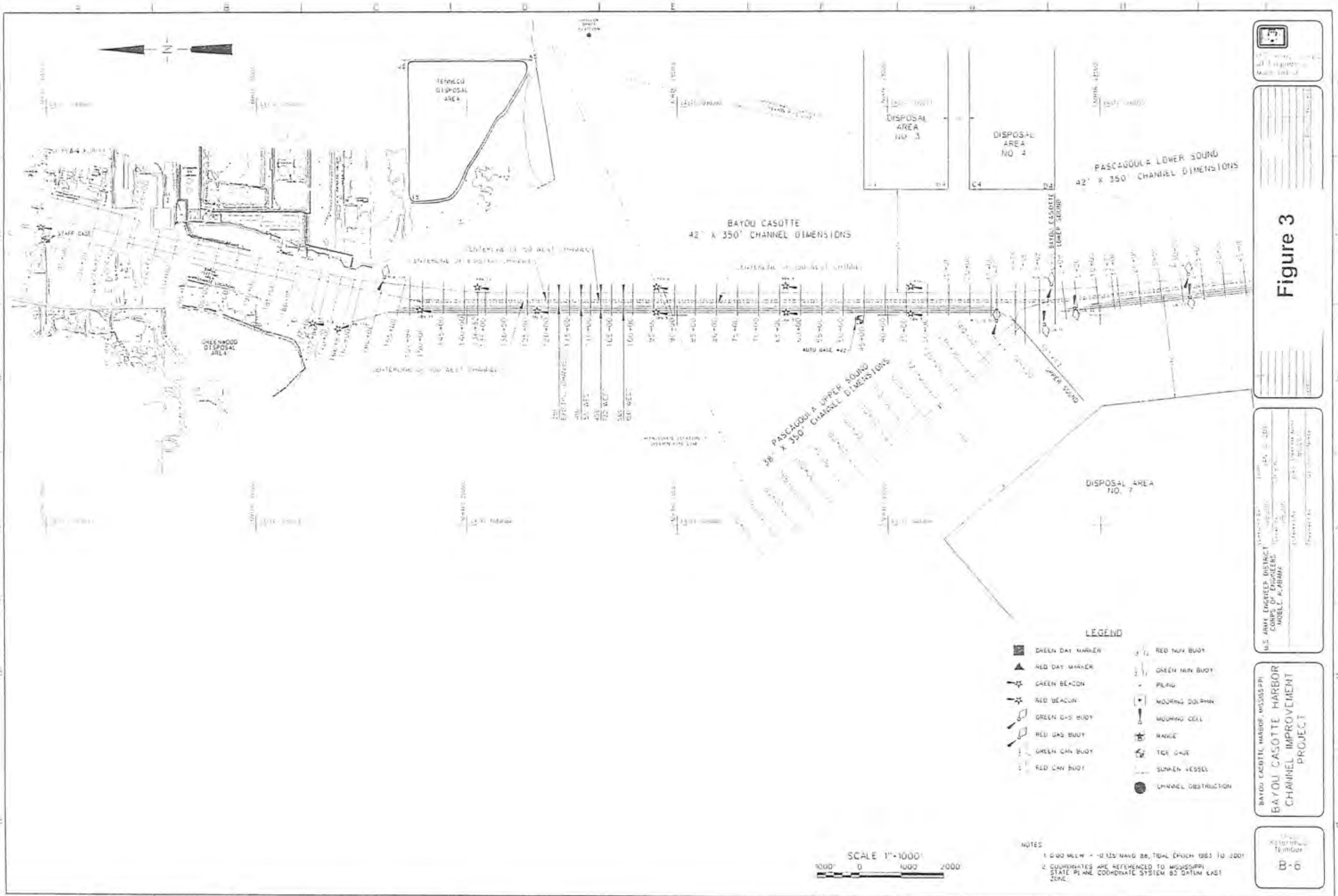


Figure 1: Vicinity Map



LEGEND
GREEN DAY MARKER
RED DAY MARKER
GREEN BEACON
RED BEACON
GREEN GAS BUOY
RED GAS BUOY
GREEN CAN BUOY
RED CAN BUOY
RED NUN BUOY
GREEN NUN BUOY
PILING
MOORING DOLPHIN
MOORING CELL
RANGE
TIDE GAGE
SUNKEN VESSEL
DENOTES EXTENTS OF WIDENING PROJECT
GULF OF MEXICO
LOCALITY MAP
DISPOSAL AREA NO. 4
DISPOSAL AREA NO. 3
EXTENTS OF WIDENING PROJECT
GULF INTRACOASTAL WATERWAY
BAYOU CASOTTE 42' X 350' CHANNEL DIMENSIONS
PASCAGOULA LOWER SOUND 42' X 350' CHANNEL DIMENSIONS
HORN ISLAND PASS 44' X 800' CHANNEL DIMENSIONS
PETIT BOIS
SEDIMENT TRAP
HORN ISLAND PASS BAR CHANNEL
UPPER SOUND
DISPOSAL AREA NO. 8
DISPOSAL AREA NO. 9
DISPOSAL AREA 10
DISPOSAL AREA NO. 7
LITTORAL ZONE DISPOSAL AREA
PASCAGOULA UPPER SOUND 38' X 350' CHANNEL DIMENSIONS
PASCAGOULA RIVER 38' X 350' CHANNEL DIMENSIONS
DISPOSAL AREA NO. 6 SOUTH
DISPOSAL AREA NO. 6 NORTH
DISPOSAL AREA NO. 5
FISHERMAN'S CUT
SPANISH POINT
NAVY HOME PORT BRIDGE
44' X 350' PASCAGOULA BAR CHANNEL DIMENSIONS
HORN ISLAND
OCEAN DREDGE MATERIAL DISPOSAL SITE (ODMDS)
SCALE 1"=3000'
3000 0 3000 6000
NOTES:
1. 0.00 MLLW = -0.115' NAVD 88, TIDAL EPOCH 1983 TO 2001
2. COORDINATES ARE REFERENCED TO MISSISSIPPI STATE PLANE COORDINATE SYSTEM 83 DATUM EAST ZONE
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA
BAYOU CASOTTE HARBOR, MISSISSIPPI
BAYOU CASOTTE HARBOR CHANNEL IMPROVEMENT PROJECT
B-1

Figure 2



TENNECO DISPOSAL AREA
DISPOSAL AREA NO. 3
DISPOSAL AREA NO. 4
PASCAGOULA LOWER SOUND
42' x 350' CHANNEL DIMENSIONS
BAYOU CASOTTE
42' x 350' CHANNEL DIMENSIONS
GREENWOOD DISPOSAL AREA
PASCAGOULA UPPER SOUND
38' x 350' CHANNEL DIMENSIONS
UPPER SOUND
DISPOSAL AREA NO. 7
LEGEND
GREEN DAY MARKER
RED DAY MARKER
GREEN BEACON
RED BEACON
GREEN GAS BUOY
RED GAS BUOY
GREEN CAN BUOY
RED CAN BUOY
RED NUN BUOY
GREEN NUN BUOY
PILING
MOORING DOLPHIN
MOORING CELL
RANGE
TIDE GAGE
SUNKEN VESSEL
CHANNEL OBSTRUCTION
SCALE 1"=1000'
1000' 0 1000' 2000'
NOTES
1. 0.00 MLLW = -0.135 NAVD 88, TIDAL EPOCH 1983 TO 2001
2. COORDINATES ARE REFERENCED TO MISSISSIPPI STATE PLANE COORDINATE SYSTEM 83 DATUM EAST ZONE.
Figure 3
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA
BAYOU CASOTTE HARBOR, MISSISSIPPI
BAYOU CASOTTE HARBOR CHANNEL IMPROVEMENT PROJECT
B-6

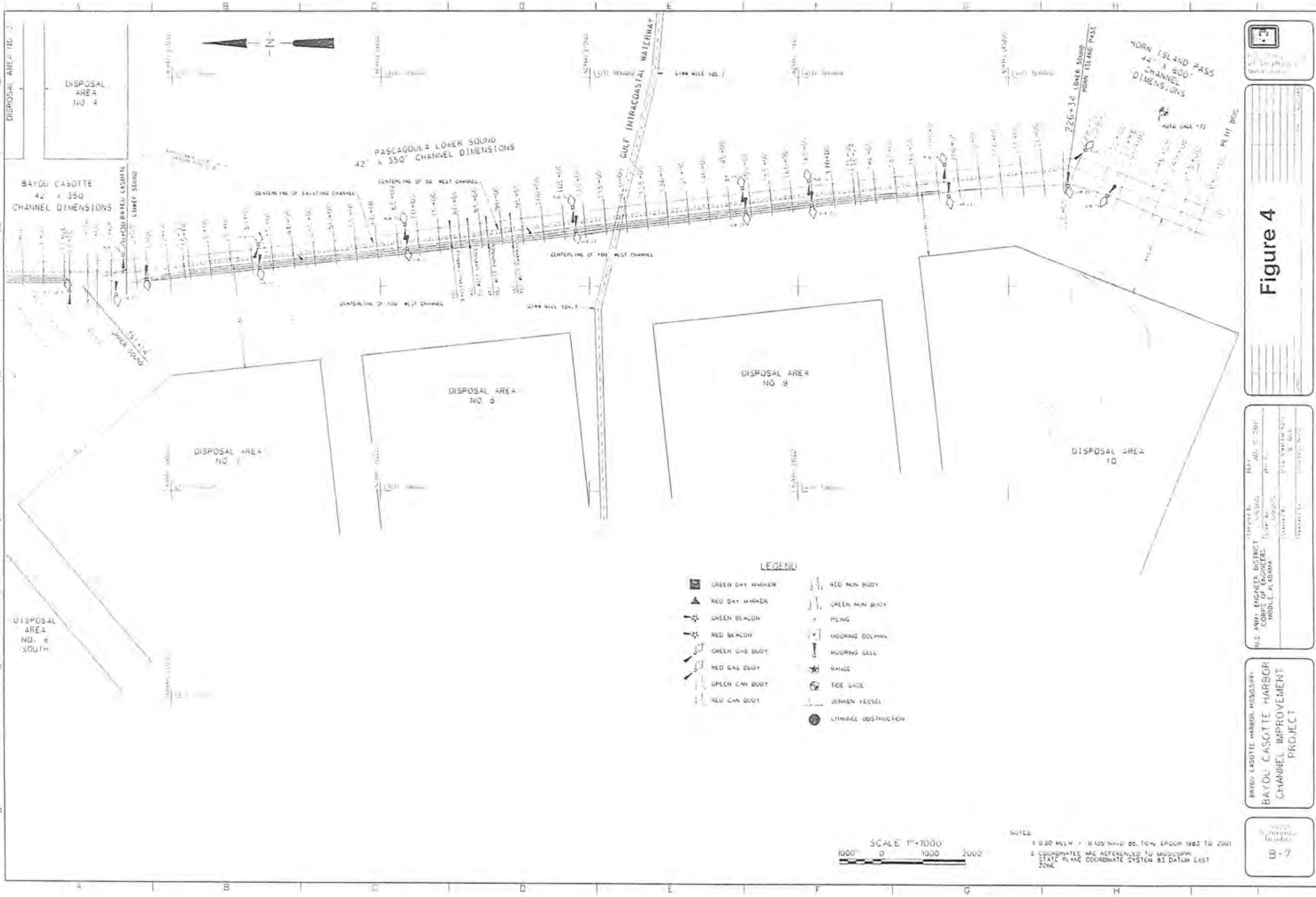
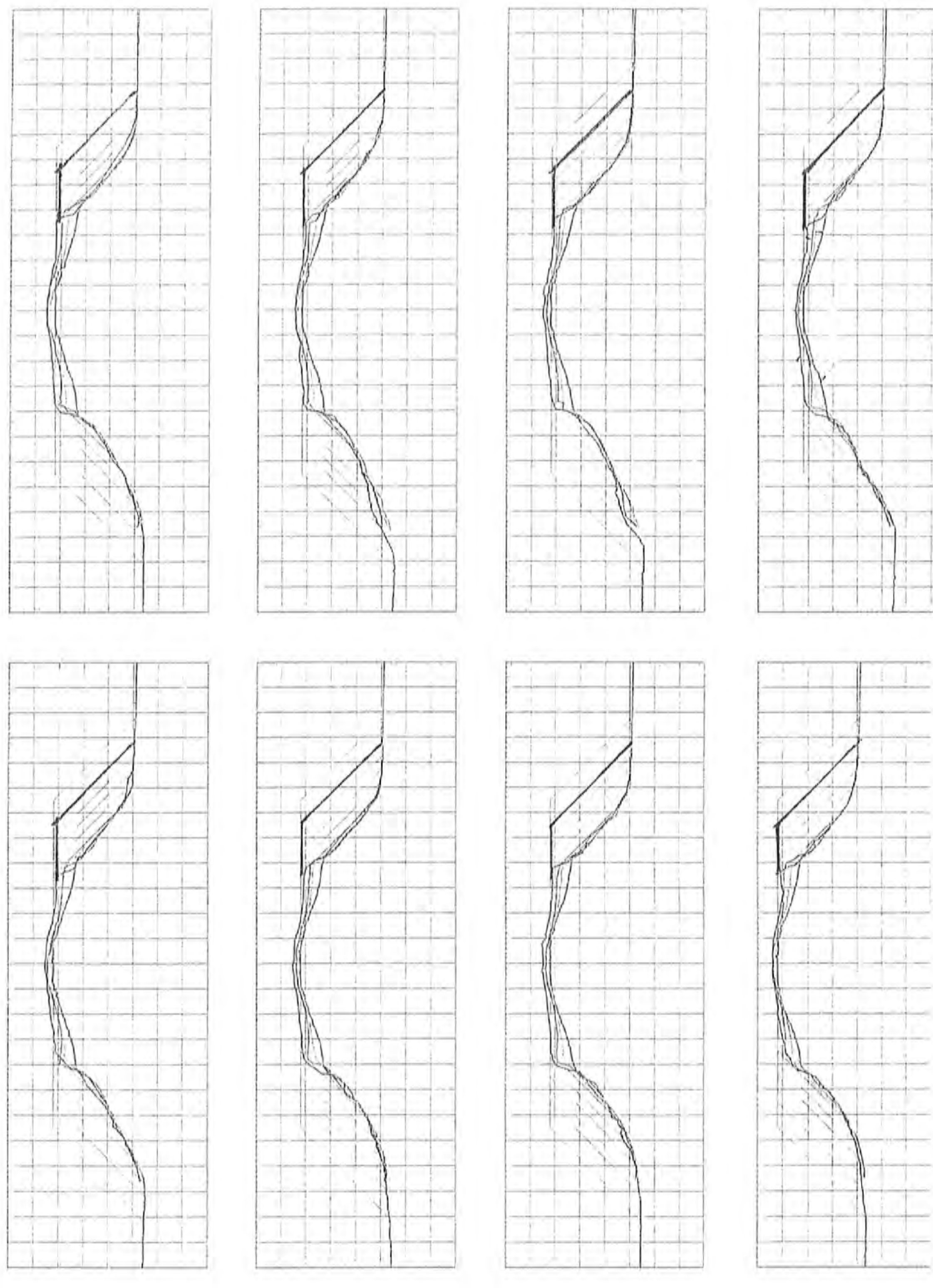


Figure 4
DISPOSAL AREA NO. 2
DISPOSAL AREA NO. 4
PASCAGOULA LOWER SOUND
42' x 350' CHANNEL DIMENSIONS
BAYOU CASOTTE
42' x 350'
CHANNEL DIMENSIONS
GULF INTRACOASTAL WATERWAY
HORN ISLAND PASS
42' x 600'
CHANNEL
DIMENSIONS
226+32 LOWER SOUND
HORN ISLAND PASS
DISPOSAL AREA NO. 7
DISPOSAL AREA NO. 8
DISPOSAL AREA NO. 9
DISPOSAL AREA 10
DISPOSAL AREA NO. 6 SOUTH
LEGEND
GREEN DAY MARKER
RED DAY MARKER
GREEN BEACON
RED BEACON
GREEN GAS BUOY
RED GAS BUOY
GREEN CAN BUOY
RED CAN BUOY
RED NUN BUOY
GREEN NUN BUOY
PILING
MOORING DOLPHIN
MOORING CELL
RANGE
TIDE GAGE
SUNKEN VESSEL
CHANNEL OBSTRUCTION
SCALE 1"=1000'
1000' 0 1000 2000'
NOTES:
1. 0.00 MLLW = -0.135 NAVD 88, TIDAL EPOCH 1983 TO 2001
2. COORDINATES ARE REFERENCED TO MISSISSIPPI STATE PLANE COORDINATE SYSTEM 83 DATUM EAST ZONE
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA
BAYOU CASOTTE HARBOR, MISSISSIPPI
BAYOU CASOTTE HARBOR
CHANNEL IMPROVEMENT
PROJECT
B-7



3 OF 6

PASCAGOULA HARBOR, MISSISSIPPI

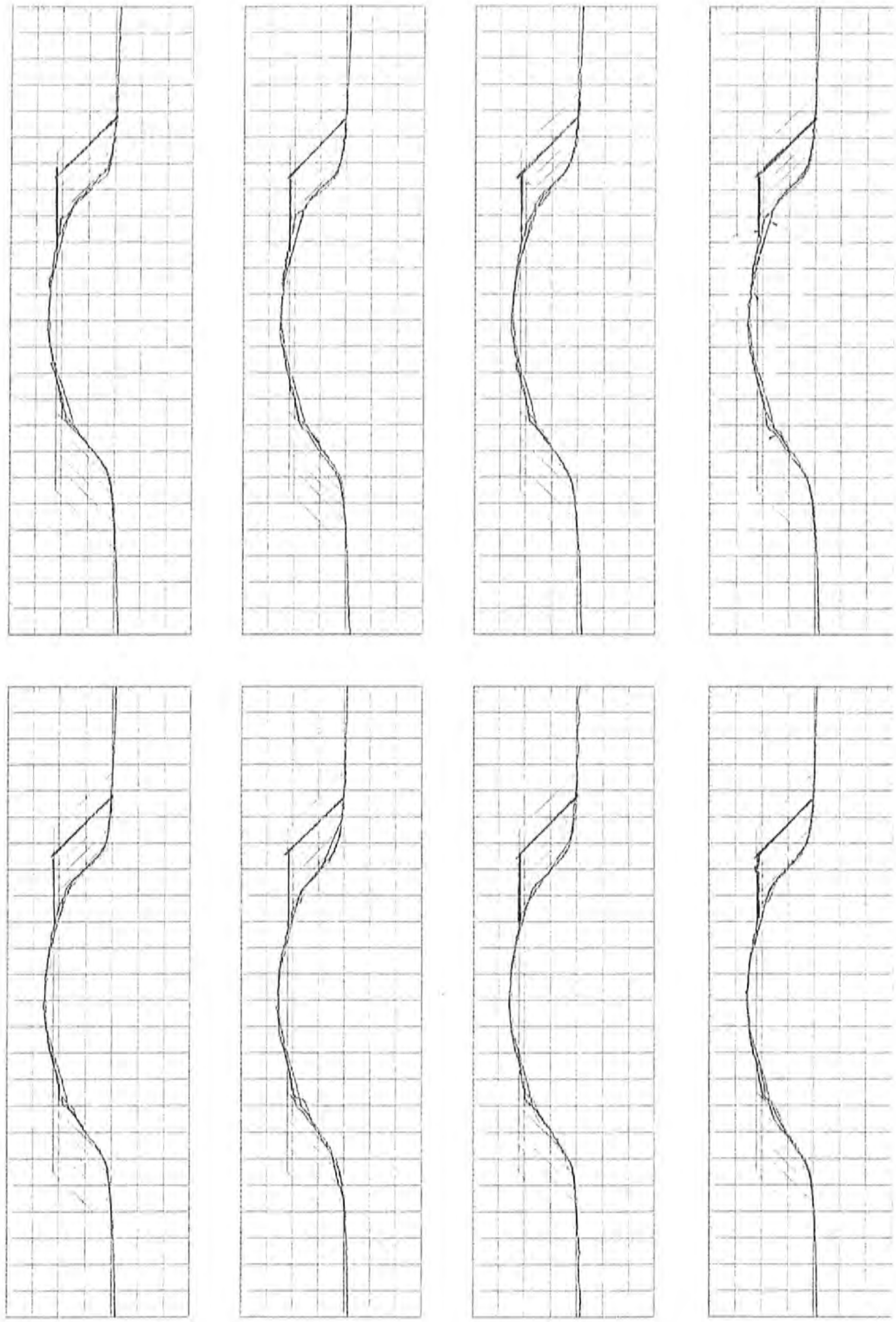
PROPOSED WIDENING
BAYOU CASOTTE
CROSS SECTIONS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA

J. GIBSON	FEB 2, 2010
J. GIBSON	CH103971
	BCG0SH3.DGN
M. MCKOWN	

Figure 5

US Army Corps
of Engineers
Mobile District



Sheet Reference Number: 3 OF 6	PASCAGOULA HARBOR, MISSISSIPPI PROPOSED WIDENING PASCAGOULA LOWER CROSS SECTIONS	U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA	Designed by: J. GIBSON Drawn by: J. GIBSON Checked by: Reviewed by: P. MCKOWN
			Date: FEB 2, 2010 Code: CH03971 CADD Sheet File Name: P_GOSH3.DGN Drawing Number:

Figure 6

US Army Corps of Engineers
Mobile District

ATTACHMENT "C"

ENVIRONMENTAL ASSESSMENT

The proposed project is to widen the existing Pascagoula Lower Sound/ Bayou Casotte Federal Channel segment 100 feet on the west side parallel to the existing channel centerline. The improved channel length would be approximately 38,137 feet (7.22 miles) long. New work dredging quantity estimates are approximately 3.35 million cubic yards. One-on-five channel side slopes are being used for the with project condition as in the existing condition. With channel modification, some US Coast Guard channel beacons and markers will require relocation. Future maintenance dredging of the channel improvements will be conducted by the U.S. Army Corps of Engineers as part of their normal maintenance dredging schedule of the existing Federal Channel work.

The new work material will be dredged with combinations of hopper, hydraulic pipeline and/ or mechanical type dredges. It is anticipated that most of the material associated with the channel improvement measures will be hydraulically excavated by hopper dredge. Preliminary results indicate that a small portion of the material is sand and suitable for beneficial use. Therefore, this material will be placed in the littoral zone disposal area, located southeast of the east end of Horn Island. The remaining material will be placed in the U.S. Environmental Protection Agency (EPA) designated Pascagoula Ocean Dredged Material Disposal Area (ODMDS).

Dredging associated with the work would temporarily impact open water habitat. Dredging could increase sedimentation and turbidity in the immediate vicinity of the operations, potentially resulting in short-term impacts on fish and other biological resources in the area. Increased sedimentation and turbidity due to the dredging activities would be temporary, and suspended sediments would likely return to background levels in a short time after and a short distance from the point of disturbance. There will be no wetland impacts at the dredging site.

Federally listed endangered or threatened species have been identified in previous studies to potentially occur within the dredging areas. The portion of the Mississippi Sound affected by the project has also been designated as critical habitat for the Gulf sturgeon. An Environmental Impact study will be prepared to address the requirements for minimizing impacts on endangered or threatened species and critical habitat.

Environmental laws and regulations will be followed during dredging, disposal and material management operations. Best Management procedures will be incorporated during the handling of dredged sediment to reduce impacts on water quality. Requirements issued during interagency coordination and response letters will be addressed and followed during the dredging activity.

Appendix H

Agency Workshop and Public Hearing Summary Report

Draft Environmental Impact Statement for the Proposed Widening of the

Pascagoula Lower Sound/Bayou Casotte Channel

Jackson County, Mississippi

US Army Corps of Engineers®
Mobile District

Agency Workshop and Public Hearing
Summary Report

May 10, 2012

Prepared For:

US Army Corps
of Engineers®
Mobile District

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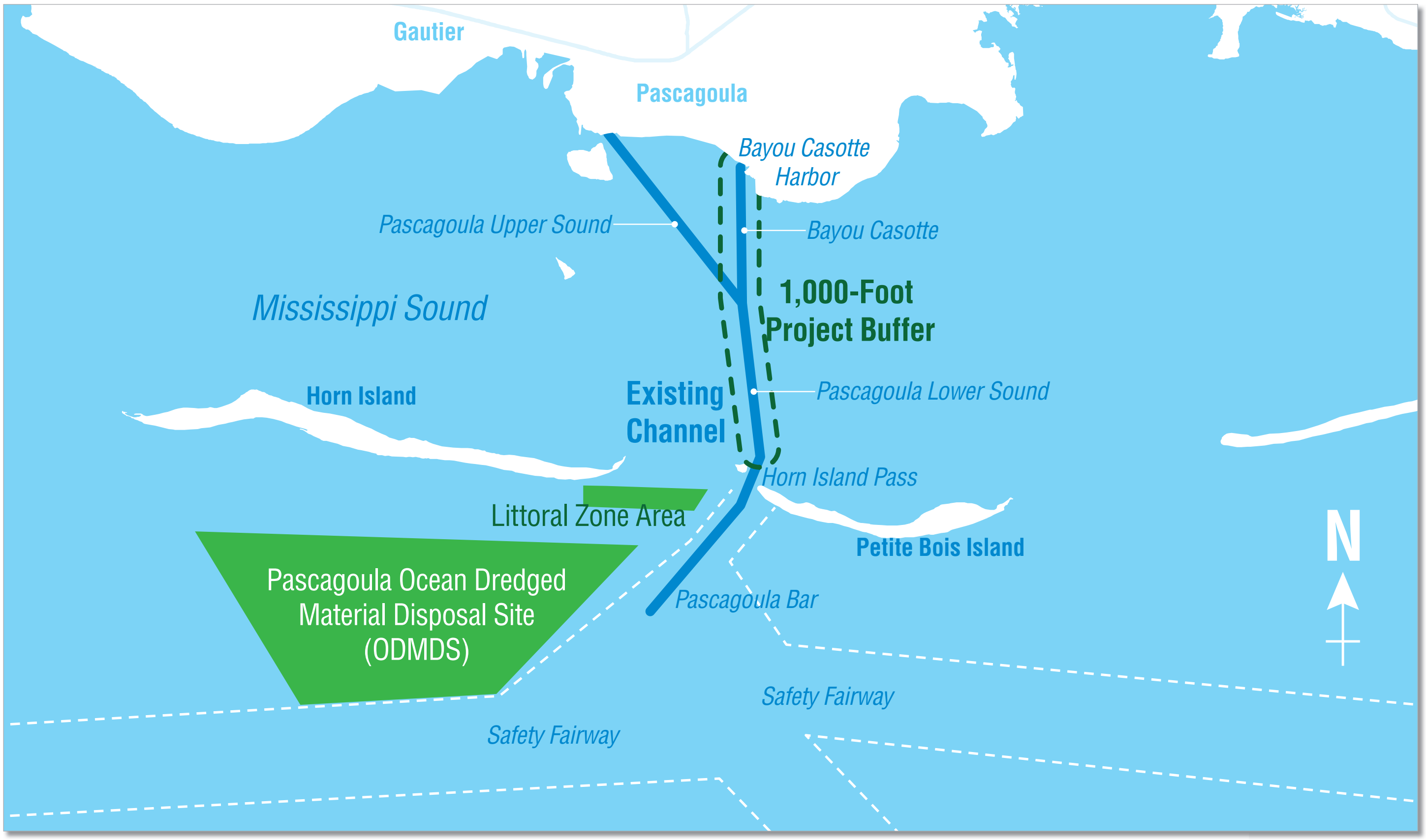


Project Vicinity Map

Project Background and Purpose

On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application to the U.S. Army Corps of Engineers (Corps) Mobile District, the Mississippi Department of Environmental Quality, and the Mississippi Department of Marine Resources for authorization to impact wetlands and other waters of the United States associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel (the proposed project) in Jackson County, Mississippi. The proposed project is located in the Pascagoula Lower Sound/ Bayou Casotte Channel, Pascagoula, Jackson County, Mississippi (Latitude 30.365° North, Longitude 88.556° West).

The Bayou Casotte Harbor Improvement Project is proposed to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the turning basin in Bayou Casotte. The project is intended to reconfigure the channel in order to alleviate current transit restrictions and increase travel efficiencies for vessel transit. The project is also intended to improve conditions for port operations, and maintain or improve the current level of safety for vessel operations under the improved conditions.

Above is an example of a liquid natural gas tanker navigating through Bayou Cassotte Channel.

On behalf of the Corps, a third party consultant prepared a Draft Environmental Impact Statement (DEIS) to assess the potential environmental impacts associated with the proposed project. The proposed project is the dredging of approximately

38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Channel segment to widen the channel from the federally authorized width of 350 feet and depth of 42 feet mean lower low water (MLLW) (with 2 feet of allowable over-depth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing federally authorized depth of 42 feet MLLW. The proposed project would include the placement of approximately 3.4 million cubic yards of dredged material resulting from the channel modification.

The Corps invited full public participation to promote open communication and solicit feedback on the DEIS.

The JCPA requested a Department of the Army (DOA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 103 of the Marine Protection, Research and Sanctuaries Act and Section 404 of the Clean Water Act, including a Section 404(b)(1) analysis to help ensure compliance. The Corps is the lead federal agency for the preparation of this DEIS in compliance with the requirements of the National Environmental Policy Act (NEPA) and the President's Council on Environmental Quality regulations for implementing NEPA. The National Marine Fisheries Service and the U.S. Coast Guard are cooperating agencies for the preparation of the EIS.

An agency workshop and a public hearing were held on May 10, 2012, to provide information about the proposed project and to receive public and agency comments on the DEIS. The Corps invited full public participation to promote open communication and solicit feedback on the DEIS. In addition, participation by federal, state, and local agencies, other interested organizations, and members of the public was encouraged.

Previous and Related Public Involvement

As part of the Corps Planning Division EIS, a public scoping meeting was conducted on Thursday, February 25, 2010, for the proposed project. The meeting was held to receive public comments and assess concerns regarding the appropriate scope and preparation of the Draft EIS. Participation in the public scoping meeting by federal, state, and local agencies was encouraged. This meeting was held from 5:30 p.m. to 7:30 p.m., at the Pascagoula Public Library, 3214 Pascagoula Street, Pascagaoula, Mississippi, 39567. Additionally, the Corps Regulatory Division held a 30-day comment period for the permit application from April 15, 2011, to May 16, 2011. All project-related public noticing published in the Federal Register is available in Appendix A.

On April 13, 2012, a copy of the DEIS was made available for public review. The DEIS is available to the public at: www.sam.usace.army.mil/rd/reg. Hardcopies of the DEIS were available upon request from Mr. Philip A. Hegji, Corps Project Manager. The DEIS was circulated to resource agencies and interested stakeholders for a 45-day comment period ending on May 29, 2012.

Agency representatives were invited to attend an informal, round-table discussion on May 10, 2012.

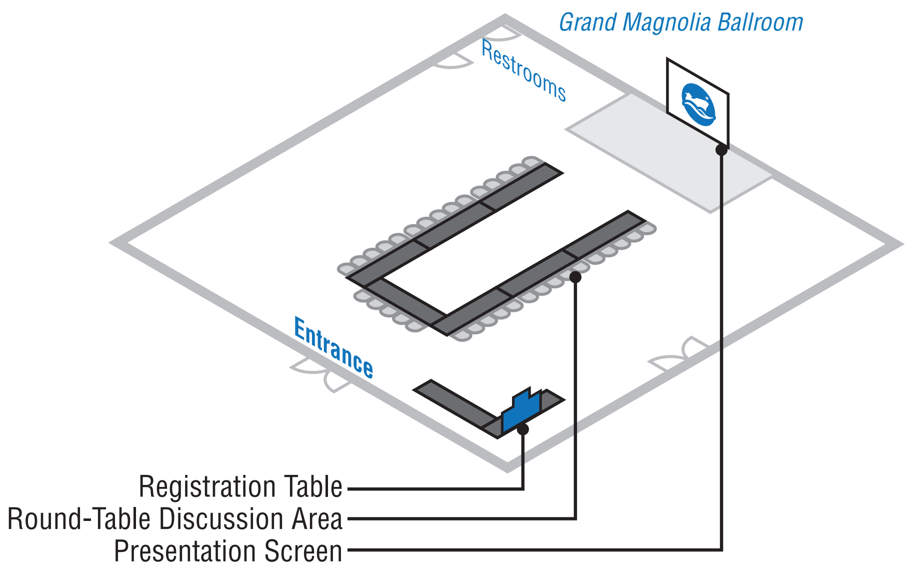
May 10, 2012 Agency Workshop Summary

The Corps hosted an agency workshop for the DEIS for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel on Thursday, May 10, 2012, at the Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, Mississippi, 39567.

The purpose of the agency workshop was to present the DEIS to interested agencies and accept comments. The comments received at the agency workshop have been considered by the Corps and are addressed in the final version of the EIS.

Agency representatives were invited to an informal, round-table discussion from 2:00 p.m. to 4:00 p.m. Upon arrival, attendees were asked to sign in at the registration table and provided with a workshop agenda and project newsletter. During the workshop representatives were able to speak to project representatives about the proposed project. Copies of the agency workshop agenda and project newsletter are available in Appendix C. A workshop room layout for the agency workshop is available in Appendix B.

Room layout of the agency workshop at the Grand Magnolia Ballroom



Corps Project Manager Philip Hegji opened the workshop, provided a brief introduction to the proposed project, and led the open discussion with agency representatives. Agency representatives were provided with an opportunity to express their concerns and inform the Corps of items to be addressed in the final version of the EIS. Topics discussed during the workshop included fisheries habitat protection and marine resources, among others.

Agency representatives were provided with an opportunity to express their concerns and inform the Corps of items to be addressed in the EIS.

Agencies that participated at the agency workshop included:

- Environmental Protection Agency
- National Marine Fisheries Service
- Mississippi Department of Marine Resources
- Mississippi Department of Environmental Quality
- United States Coast Guard

The agency workshop was attended by 15 people. A complete list of attendees is included in Appendix D. Representative photographs documenting the agency workshop are available in Appendix E.

Attendees were encouraged to submit written comments either at the agency workshop or by mail or e-mail by May 29, 2012. Comment forms were provided to attendees to document comments, questions, and considerations for the DEIS. All comments received were documented in a comment database. The comment database and copies of submitted comments are available in Appendix I of the final EIS.

The workshop adjourned at 4:00 p.m.

At 7:00 p.m., Corps Mobile District Commanding Officer, Steven Roemhildt, opened the hearing and explained the Corps' ground rules for the public hearing.

May 10, 2012 Public Hearing Summary

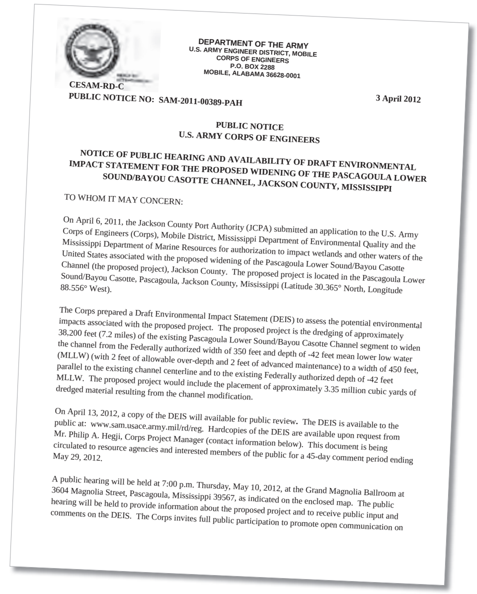
The Corps hosted a public hearing for the DEIS for the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel on Thursday, May 10, 2012, from 6:00 p.m. to 9:00 p.m. at the Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, Mississippi, 39567.

The purpose of the public hearing on May 10, 2012, was to announce the availability of the DEIS for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, and to share information about the DEIS in compliance with NEPA requirements and the President's Council on Environmental Quality regulations for implementing NEPA. The National Marine Fisheries Service and the U.S. Coast Guard were cooperating agencies for the preparation of this DEIS. The comments received at the public hearing have been considered by the Corps and are addressed in the final version of the EIS.

Noticing for the public hearing was accomplished by a number of methods, including public notices in the Federal Register, agency and stakeholder letters, newspaper advertisements in the *Mississippi Press* and *Sun Herald*, a news release distributed to local media, and a web banner on the USACE Mobile District and City of Pascagoula websites. The complete public official and stakeholder invitation list, along with copies of all other noticing mechanisms are available in Appendix A.

The public was invited to an informal open house style meeting from 6:00 p.m. to 7:00 p.m. and a formal public hearing from 7:00 p.m. to 9:00 p.m. Upon arrival, attendees were invited to complete an attendee card at the registration table. Copies of the completed attendee cards are available in Appendix D. Attendees also received a project newsletter and a comment form. These collateral materials are available in Appendix C.

During the open house, attendees were invited to view displays around the room to learn about the proposed project. A display plan and copies of these display materials are available in Appendix B. Project representatives from the Corps and the JCPA



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

CESAM-RD-C
PUBLIC NOTICE NO: SAM-2011-00389-PAH — 3 April 2012

PUBLIC NOTICE
U.S. ARMY CORPS OF ENGINEERS

NOTICE OF PUBLIC HEARING AND AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED WIDENING OF THE PASCAGOULA LOWER SOUND/BAYOU CASOTTE CHANNEL, JACKSON COUNTY, MISSISSIPPI

TO WHOM IT MAY CONCERN:

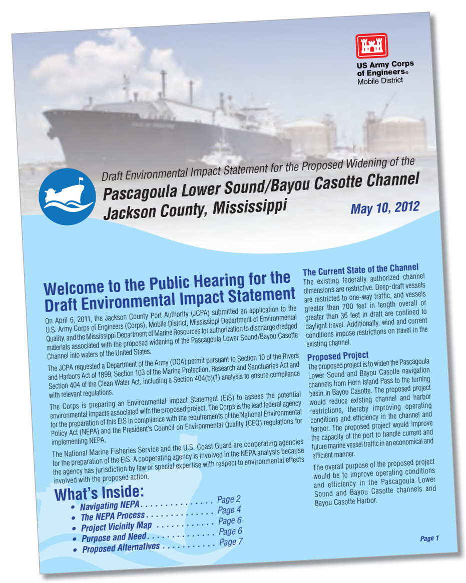
On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application to the U.S. Army Corps of Engineers (Corps), Mobile District, Mississippi Department of Environmental Quality and the Mississippi Department of Marine Resources for authorization to impact wetlands and other waters of the United States associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel (the proposed project), Jackson County. The proposed project is located in the Pascagoula Lower Sound/Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365° North, Longitude 88.556° West).

The Corps prepared a Draft Environmental Impact Statement (DEIS) to assess the potential environmental impacts associated with the proposed project. The proposed project is the dredging of approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Channel segment to widen the channel from the Federally authorized width of 350 feet and depth of -42 feet mean lower low water (MLLW) (with 2 feet of allowable over-depth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of -42 feet MLLW. The proposed project would include the placement of approximately 3.35 million cubic yards of dredged material resulting from the channel modification.

On April 13, 2012, a copy of the DEIS will available for public review. The DEIS is available to the public at: www.sam.usace.army.mil/rd/reg. Hardcopies of the DEIS are available upon request from Mr. Philip A. Hegji, Corps Project Manager (contact information below). This document is being circulated to resource agencies and interested members of the public for a 45-day comment period ending May 29, 2012.

A public hearing will be held at 7:00 p.m. Thursday, May 10, 2012, at the Grand Magnolia Ballroom at 3604 Magnolia Street, Pascagoula, Mississippi 39567, as indicated on the enclosed map. The public hearing will be held to provide information about the proposed project and to receive public input and comments on the DEIS. The Corps invites full public participation to promote open communication on

Stakeholder letters are one example of noticing for the May 10, 2012 public hearing.



US Army Corps of Engineers®
Mobile District

Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi
May 10, 2012

Welcome to the Public Hearing for the Draft Environmental Impact Statement

On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application to the U.S. Army Corps of Engineers (Corps), Mobile District, Mississippi Department of Environmental Quality, and the Mississippi Department of Marine Resources for authorization to discharge dredged materials associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel into waters of the United States.

The JCPA requested a Department of the Army (DOA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 103 of the Marine Protection, Research and Sanctuaries Act and Section 404 of the Clean Water Act, including a Section 404(b)(1) analysis to ensure compliance with relevant regulations.

The Corps is preparing an Environmental Impact Statement (EIS) to assess the potential environmental impacts associated with the proposed project. The Corps is the lead federal agency for the preparation of this EIS in compliance with the requirements of the National Environmental Policy Act (NEPA) and the President's Council on Environmental Quality (CEQ) regulations for implementing NEPA.

The National Marine Fisheries Service and the U.S. Coast Guard are cooperating agencies for the preparation of the EIS. A cooperating agency is involved in the NEPA analysis because the agency has jurisdiction by law or special expertise with respect to environmental effects involved with the proposed action.

What's Inside:

- *Navigating NEPA* .... Page 2
- *The NEPA Process* .... Page 4
- *Project Vicinity Map* .... Page 6
- *Purpose and Need* .... Page 6
- *Proposed Alternatives* .... Page 7

The Current State of the Channel

The existing federally authorized channel dimensions are restrictive. Deep-draft vessels are restricted to one-way traffic, and vessels greater than 700 feet in length overall or greater than 36 feet in draft are confined to daylight travel. Additionally, wind and current conditions impose restrictions on travel in the existing channel.

Proposed Project

The proposed project is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the turning basin in Bayou Casotte. The proposed project would reduce existing channel and harbor restrictions, thereby improving operating conditions and efficiency in the channel and harbor. The proposed project would improve the capacity of the port to handle current and future marine vessel traffic in an economical and efficient manner.

The overall purpose of the proposed project would be to improve operating conditions and efficiency in the Pascagoula Lower Sound and Bayou Casotte channels and Bayou Casotte Harbor.

Page 1

Attendees were provided with a project newsletter after registration.

were available throughout the open house to speak one-on-one with attendees and answer questions. A hearing layout for the public hearing is available in Appendix B.

At 7:00 p.m., the Corps Mobile District Commanding Officer, Steven Roemhildt, opened the hearing and explained the Corps' ground rules for the public hearing. Following the introduction, JCPA Deputy Port Director Allen Moeller gave a short presentation about the proposed project. Copies of the moderator's speech and applicant's presentation are available in Appendix B.

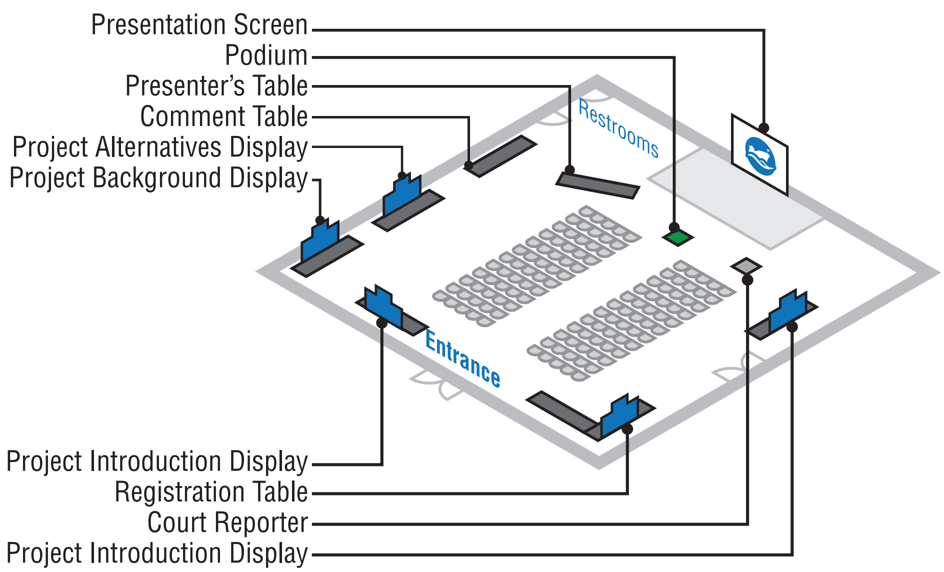
Corps project representative Damon Young, then moderated the public hearing by calling on members of the public to approach the podium and make oral comments if they requested to do so. Members of the public were allowed ten minutes to provide their oral comments. A total of three oral comments were recorded at the public hearing. All oral comments were documented by a court reporter, and an official transcript is available in Appendix E.

The public hearing was attended by 21 people. A complete list of attendees is included in Appendix D. Representative photographs documenting the public hearing are available in Appendix E.

Attendees were encouraged to submit written comments either at the public hearing or by mail or e-mail by May 29, 2012. Comment forms were provided to attendees to document comments, questions, and considerations for the DEIS. Tables were available throughout the room for attendees to complete their comment forms. Baskets were placed throughout the room to collect completed forms. A total of 8 comments addressing 12 individual comment categories were received. All comments received were documented in a comment database. The comment database and copies of submitted comments are available in Appendix I of the final EIS.

The hearing adjourned at 7:27 p.m.

Room layout of the public hearing at the Grand Magnolia Ballroom.



Members of the public were allowed ten minutes to provide their oral comments.

Comment Summary

Information and comments received at the public hearing have been considered in the final version of the EIS. The Corps accepted and considered comments submitted by May 29, 2012.

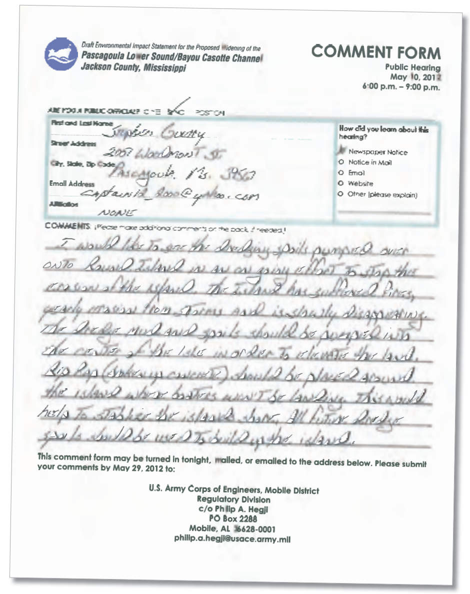
A total of eight comments were received through May 29, 2012. Comments were received orally and in the form of comment forms, mailed letters and e-mails. The submitted comments addressed 12 different comment categories. Copies of all submitted comments are available in Appendix I of the final EIS. A transcript of all oral comments made at the public hearing is available in Appendix E.

The majority of comments received demonstrated concern for the proposed project and the project alternatives. Other comments expressed concerns about mitigation and marine aquatic communities.

The following is a tabulation of the comments received as a result of the public hearing.

Individual Comment Categories (Tally of Associated Comments):

- Proposed Project (13)
- Hazardous, Toxic, and Radioactive Waste (3)
- Project Alternatives (2)
- Marine Aquatic Communities (2)
- Mitigation (2)
- Water Quality (1)
- Sediment Quality (1)
- Threatened and Endangered Species (1)
- Socioeconomics (1)
- Cumulative Impacts (1)
- Fish and Wildlife (1)
- Land Use (1)



Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

COMMENT FORM
Public Hearing
May 10, 2012
6:00 p.m. – 9:00 p.m.

First and Last Name: Stephen Guerry
Street Address: 2007 Woodmont St.
City, State, Zip Code: Pascagoula, Ms. 39567
Email Address: captain12_2000@yahoo.com
Affiliation: NONE

How did you learn about this hearing?
- Newspaper Notice
- Notice in Mail
- Email
- Website
- Other (please explain)

COMMENTS: (Please make additional comments on the back, if needed.)

I would like to see the dredging spoils pumped over onto Round Island in an on going effort to stop the erosion of the island. The island has suffered from yearly erosion from storms and is slowly disappearing. The dredge mud and spoils should be pumped into the center of the isle in order to elevate the land. Rip Rap (broken up concrete) should be placed around the island where boaters won't be landing. This would help to stabilize the island shore. All future dredge spoils should be used to build up the island.

This comment form may be turned in tonight, mailed, or emailed to the address below. Please submit your comments by May 29, 2012 to:

U.S. Army Corps of Engineers, Mobile District
Regulatory Division
c/o Philip A. Hegji
PO Box 2288
Mobile, AL 36628-0001
philip.a.hegji@usace.army.mil

Comment forms were provided to attendees to document comments, questions, and considerations for the DEIS.

Appendix A: Public Meeting Noticing

Project-Related Public Notices
Stakeholder and Public Official Mailing List
Stakeholder Letter Example
Newspaper Advertisements
News Release
Web Banner

Project-Related Public Notices

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO ATTENTION OF:

April 15, 2011

Coastal Branch
Regulatory Division

JOINT PUBLIC NOTICE SAM-2011-00389-PAH
U.S. ARMY CORPS OF ENGINEERS

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF POLLUTION CONTROL

MISSISSIPPI DEPARTMENT OF MARINE RESOURCES

PROPOSED IMPACTS TO OPEN WATER ASSOCIATED WITH THE EXPANSION OF THE BAYOU CASOTTE CHANNEL AND LOWER MISSISSIPPI SOUND CHANNEL BY THE JACKSON COUNTY PORT AUTHORITY, PASCAGOULA, JACKSON COUNTY, MISSISSIPPI

TO WHOM IT MAY CONCERN:

This District has received an application for a Department of the Army permit pursuant to Section 10 of the River and Harbors Act of 1899 and Section 103 of the Marine Protection, Research and Sanctuaries Act. Please communicate this information to interested parties.

APPLICANT: Jackson County Port Authority
Attention: Mr. Allen Moeller
Post Office Box 70
Pascagoula, Mississippi 39568

WATERWAY: In Mississippi Sound, Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365 North, Longitude 88.556 West).

WORK: The project as proposed is to widen the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment 100 feet on the west side parallel to the existing channel centerline to the existing depth of -42 feet mean high tide. The improved channel length would be approximately 38,137 feet (7.22 miles) long. New work dredging quantity estimates are approximately 3.35 million cubic yards. One-on-five channel side slopes are being used for the project condition as in the existing condition. With channel modification, some U.S. Coast Guard channel beacons and markers would require relocation.

The new work material would be dredged with combinations of hopper, hydraulic pipeline and/or mechanical type dredges. It is anticipated that most of the material associated with the channel improvement measures would be hydraulically excavated. Preliminary results indicate that a small portion of the material is sand and could suitable for beneficial use. Therefore, this material could be placed in the littoral zone disposal area, located southeast of the east end of Horn Island. The remaining material will be placed in the U.S. Environmental Protection Agency's (EPA) designated Pascagoula Ocean Dredged Material Disposal Area.

Dredging associated with the work could temporarily impact open water habitat. Dredging could increase sedimentation and turbidity in the immediate vicinity of the operations, potentially resulting in short-term impacts on fish and other biological resources in the area. Increased sedimentation and turbidity due to the dredging activities would be temporary, and suspended sediments would likely return to background levels in a short time after and a short distance from the point of disturbance. There are no wetlands impacts known to exist at the proposed dredge disposal site.

The applicant stated that environmental laws and regulations will be followed during dredging, disposal and material management operations. The applicant stated the use of best management procedures would be incorporated during the handling of dredged sediment to reduce impacts on water quality.

EXISTING CONDITIONS: The proposed channel dredging and expansion is located in Bayou Casotte and the Lower Pascagoula Channel portions of Mississippi Sound in the southeastern most portion of the state along the Gulf of Mexico. Mississippi Sound is a shallow estuary approximately 80 miles long by 9 miles wide which is separated from the Gulf of Mexico by a chain of barrier islands. Mississippi Sound has an average water depth of 10 feet, with over 99 percent of Mississippi Sound is less than 20 feet deep. The Port of Pascagoula is accessible from the Gulf of Mexico by a shipping channel located through the pass between Horn Island and Petit Bois Island in Mississippi Sound. The Horn Island Pass sea buoy marks the entrance to this channel at 30 degrees 11 minutes north and 88 degrees 3 minutes west. The channel proceeds northward crossing the Gulf Intracoastal Waterway (GIWW). Just north of the GIWW the channel splits into an eastern and western fork which leads to Bayou Casotte Harbor and the Pascagoula River Harbor, respectively.

PROJECT PURPOSE: The applicant stated the following for their project purpose and need: "The measures proposed would widen the channel north of Petit Bois island to the turning basin located at the mouth of Bayou Casotte. These measures would help to alleviate the current transiting restrictions by providing increased opportunities for vessel transit along with a potential increase in the maximum speed a vessel is allowed to transit, provide improved conditions for vessel operations, provide improved conditions for port operations, and if possible, provide improved habitat conditions through beneficial use of dredged material."

The U.S. Army Corps of Engineers (Corps) initially determined the basic project purpose is for the expansion of an existing ship navigation channel and would be considered a water dependent activity.

ALTERNATIVES: The applicant stated alternatives to the proposed action will be considered. Additional evaluation of alternatives regarding the project as proposed would be evaluated throughout the Environmental Impact Statement review process by the Corps and cooperating agencies.

MITIGATION: The applicant has not provided any mitigation details at this time.

Final compensatory mitigation will be evaluated by the Corps and cooperating resource agencies throughout the review process for the proposed project.

The applicant has applied for certification from the State of Mississippi in accordance with Section 401(a) (1) of the Clean Water Act and upon completion of the required advertising, a determination relative to certification will be made.

The applicant has applied for coastal zone consistency from the State of Mississippi Department of Marine Resources in accordance with Section 57-15-6 of the Mississippi Code Annotated.

This public notice is being distributed to all known interested persons in order to assist in developing facts on which a decision by the Corps can be based. For accuracy and completeness of the record, all data in support of or in opposition to the proposed work should be submitted in writing setting forth sufficient detail to furnish a clear understanding of the reasons for support or opposition. The decision whether to issue a permit will be based on an evaluation of the probable impact, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources.

The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered, including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, protected species, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food production and in general, the needs and welfare of the people.

The Corps is soliciting comments from the public; Federal, State and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity. Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held for consideration of this application. Requests for public hearings shall state with particularity, the reasons for holding a public hearing.

Evaluation of the probable impacts involving deposits of dredged or fill material into waters of the United States will include the application of guidelines established by the Administrator of the EPA.

The National Register of Historic Places (NRHP) will be consulted for properties listed in or eligible for the National Register which would be affected by the proposed work. Copies of this notice are being sent to the State Historic Preservation Officer (SHPO) and the U.S. Department of the Interior, National Park Service, Division of Archeological Services for further consultation and comments. Previous investigations for the facility have determined that no properties are listed in or eligible for listing in the

CESAM-RD-C **April 15, 2011**
SAM-2011-00389-PAH **Page 4 of 4**
JACKSON COUNTY PORT AUTHORITY

NRHP. In accordance with Appendix C of 33 CFR Part 325, the Corps has determined that the permit area is the full area of development for the overall project footprint. **The Corps will consult with in-house expertise and if needed SHPO to make a final determination based upon this review unless comment to this notice is received documenting that significant sites or properties exist which may be affected by this work or that adequately documents that a potential exists for the location of significant sites or properties within the permit area.**

Preliminary review of this application and the U.S. Department of the Interior List of Endangered and Threatened Wildlife and Plants indicate the proposed activity **will require additional evaluation** on the species, Gulf Sturgeon. Further evaluation will be performed to determine the potential impact to critical habitat and/or additional species. The National Marine Fisheries Service (NMFS) requires the evaluation of impacts to Essential Fish Habitat (EFH) of estuarine species. This notice initiates the EFH **informal consultation notification** of the Magnuson-Stevens Fishery Conservation and Management Act. Further coordination with the NMFS and the U.S. Fish and Wildlife Service (FWS) will be performed on the proposed project. **Formal consultation with both the NMFS and the FWS may be required as additional information is gathered and coordination is performed.**

Correspondence concerning this Public Notice should refer to Public Notice Number **SAM-2011-00389-PAH,** and should be directed to the District Engineer, U.S. Army Engineer District, Mobile, Attention: **Mr. Philip A. Hegji**, Post Office Box 2288, Mobile, Alabama 36628-0001, Attention: Coastal Branch, with a copy to the Mississippi Department of Environmental Quality, Office of Pollution Control, **Attention: Ms. Florance Watson, P.E.**, Post Office Box 2261, Jackson, Mississippi 39225 and the Mississippi Department of Marine Resources, **Attention: Mr. Ron Cole**, 1141 Bayview Avenue, Suite 101, Biloxi, Mississippi 39530, in time to be received within **30 days** of the date of this public notice.

If you have any questions concerning this publication, you may contact the project manager for this application, **Mr. Hegji** (philip.a.hegji@usace.army.mil), **(251) 690-3222**. Please refer to the above Public Notice number.

For additional information about our Regulatory Program, please visit our web site at: www.sam.usace.army.mil/rd/reg and please take a moment to complete our customer satisfaction survey while you're there. Your responses are appreciated and will allow us to improve our services.

MOBILE DISTRICT
U.S. Army Corps of Engineers

Enclosures

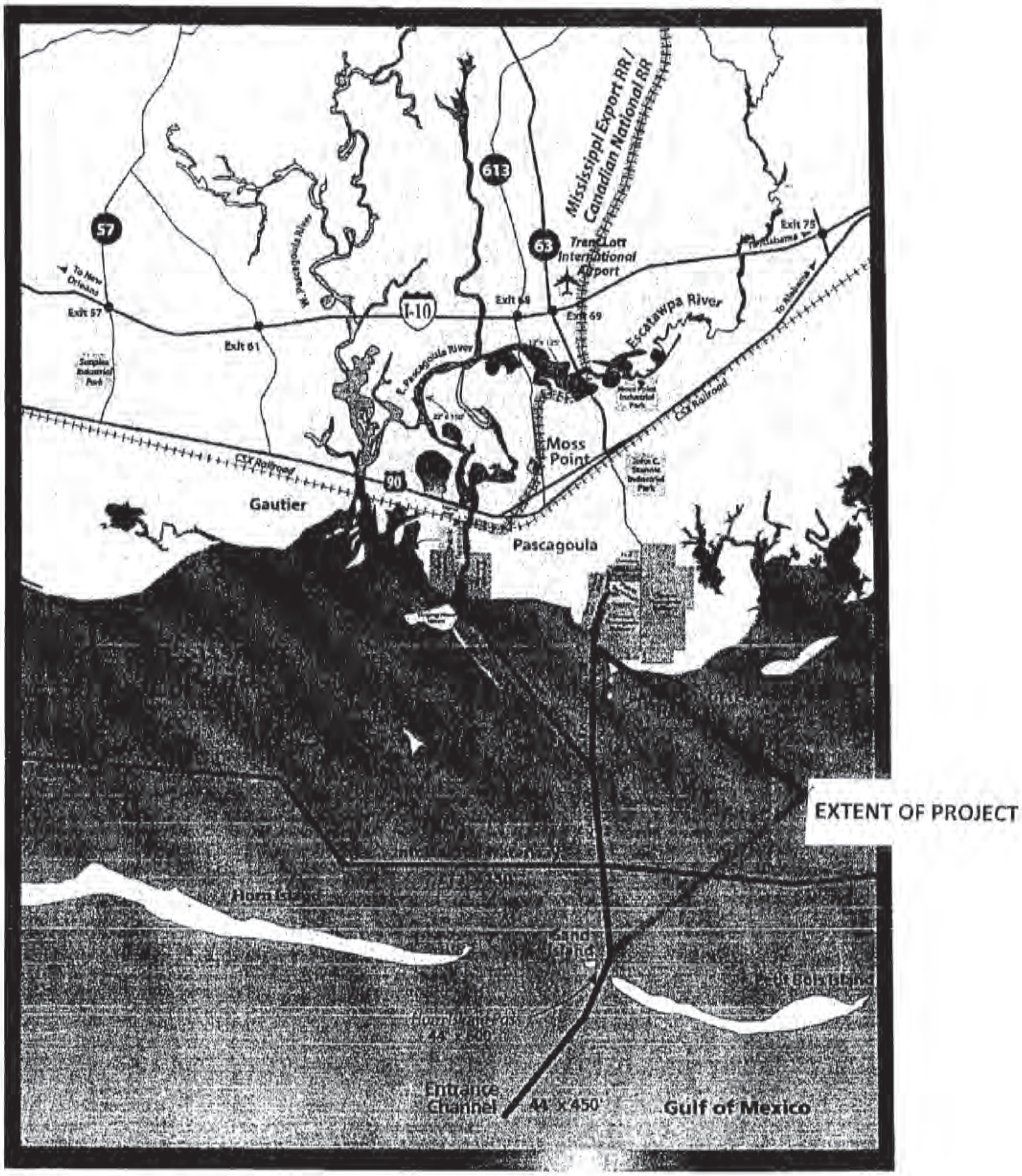
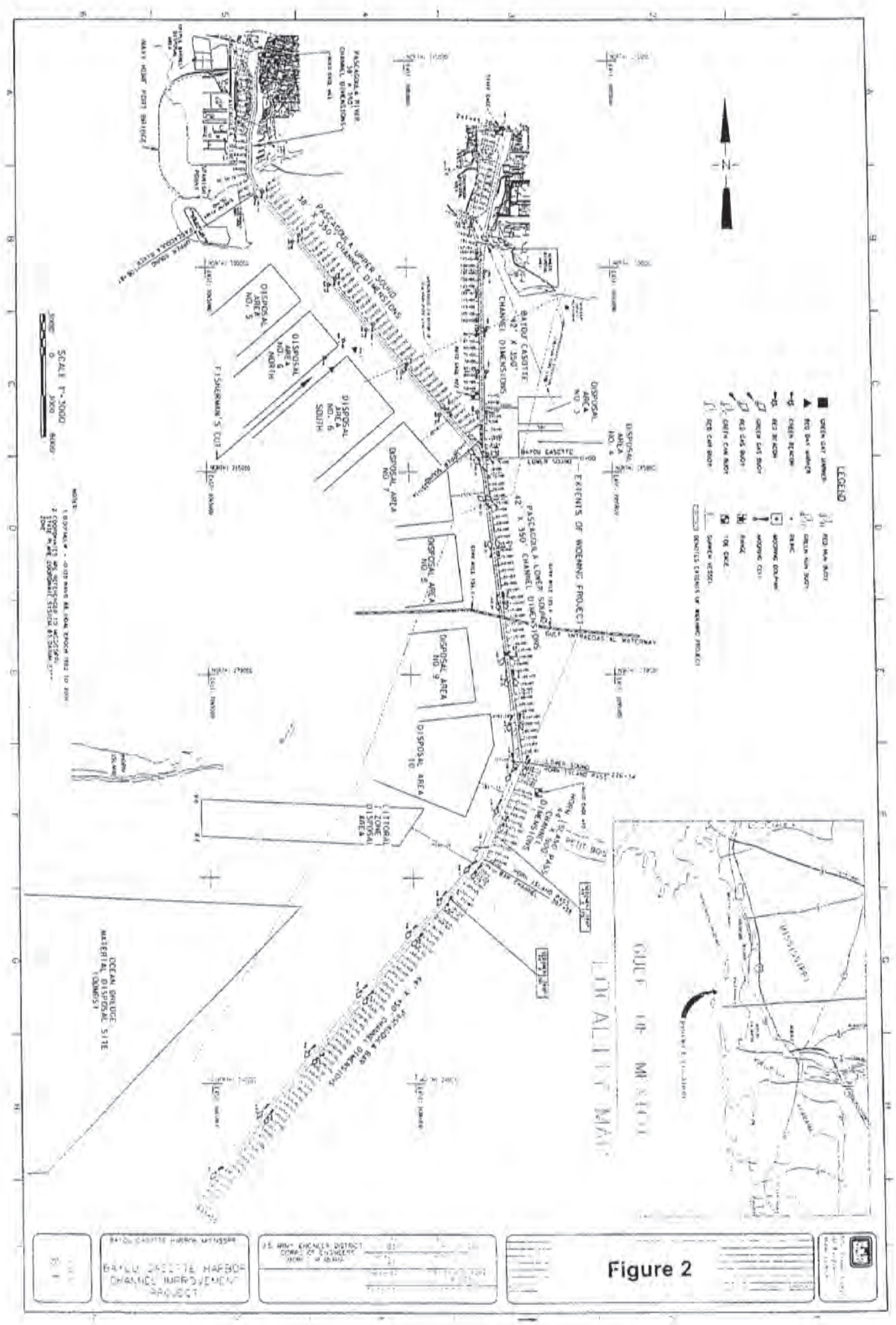


Figure 1: Vicinity Map

7


LEGEND
GULF OF MEXICO
LOCALITY MAP
EXTENTS OF WIDENING PROJECT
DISPOSAL AREA NO. 5
DISPOSAL AREA NO. 6 NORTH
DISPOSAL AREA NO. 6 SOUTH
DISPOSAL AREA NO. 7
DISPOSAL AREA NO. 8
DISPOSAL AREA NO. 9
DISPOSAL AREA 10
FISHERMAN'S CUT
OCEAN DREDGE MATERIAL DISPOSAL SITE
SCALE 1"=3000'
BAYOU CASOTTE HARBOR CHANNEL IMPROVEMENT PROJECT
Figure 2

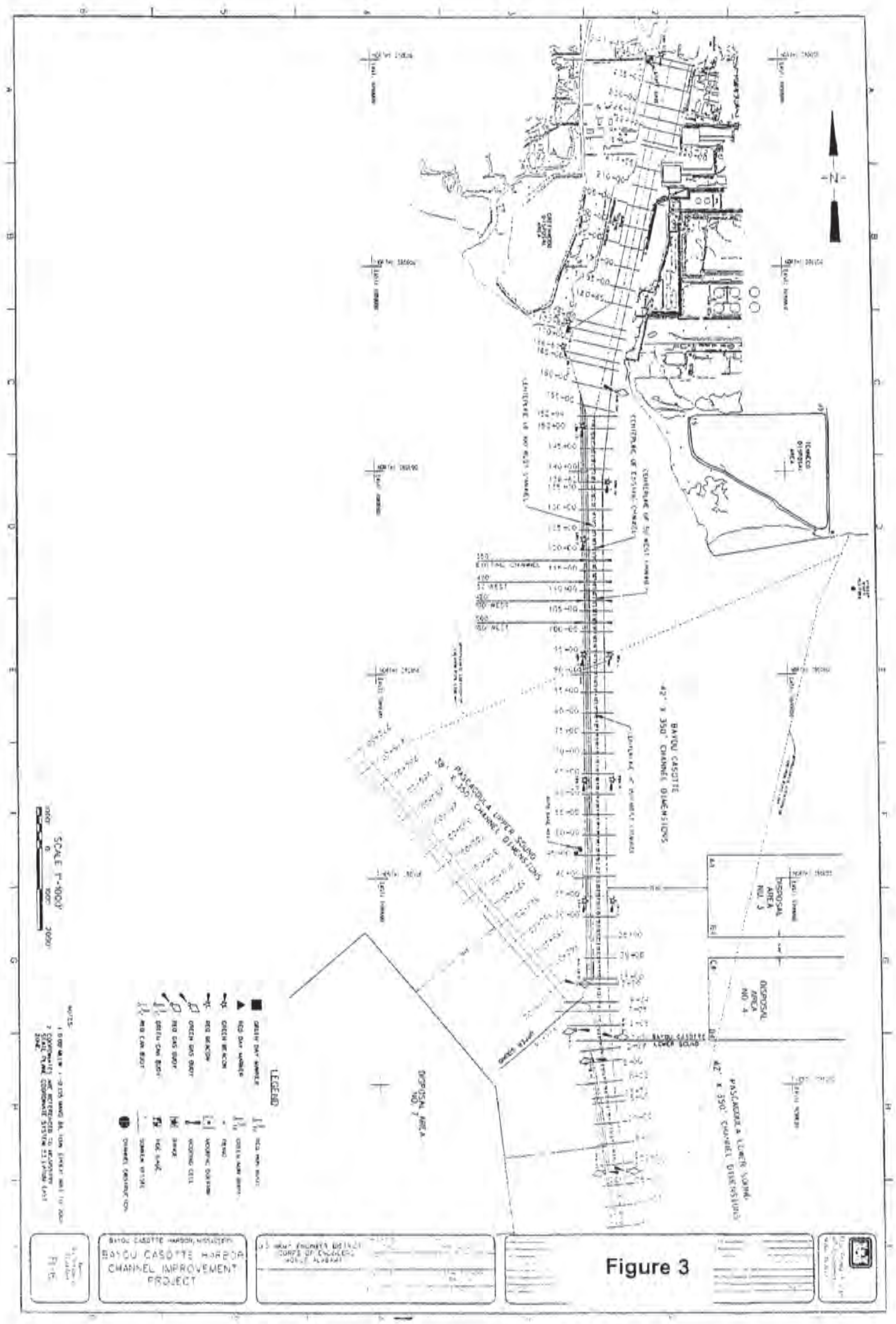

BAYOU CASOTTE HARBOR CHANNEL IMPROVEMENT PROJECT
LEGEND
SCALE 1"=1000'
BAYOU CASOTTE 42' X 350' CHANNEL DIMENSIONS
PASCAGOULA UPPER SOUND 42' X 350' CHANNEL DIMENSIONS
PASCAGOULA LOWER SOUND 42' X 350' CHANNEL DIMENSIONS
DISPOSAL AREA NO. 3
DISPOSAL AREA NO. 4
DISPOSAL AREA NO. 7

Figure 3

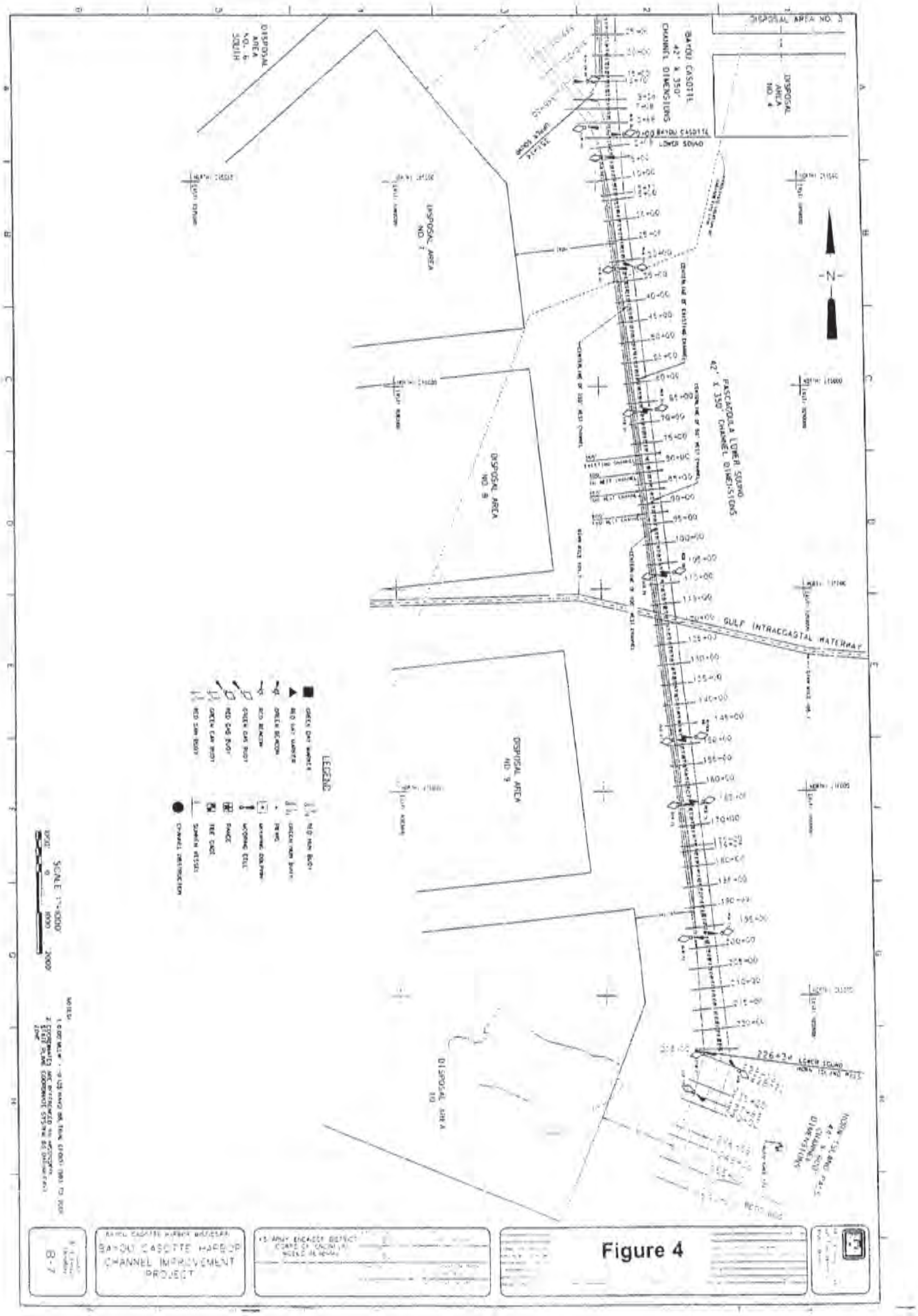


Figure 4

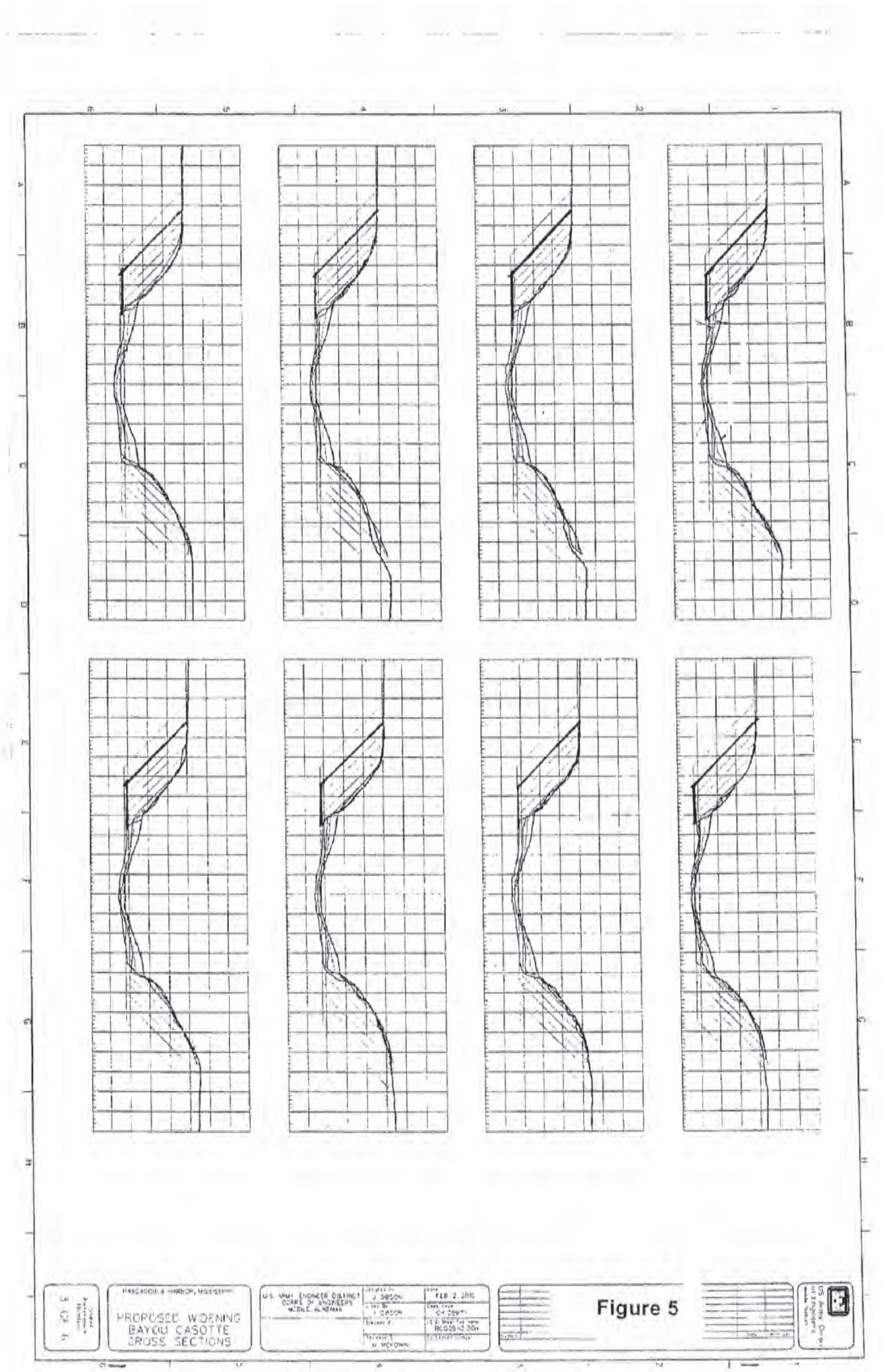
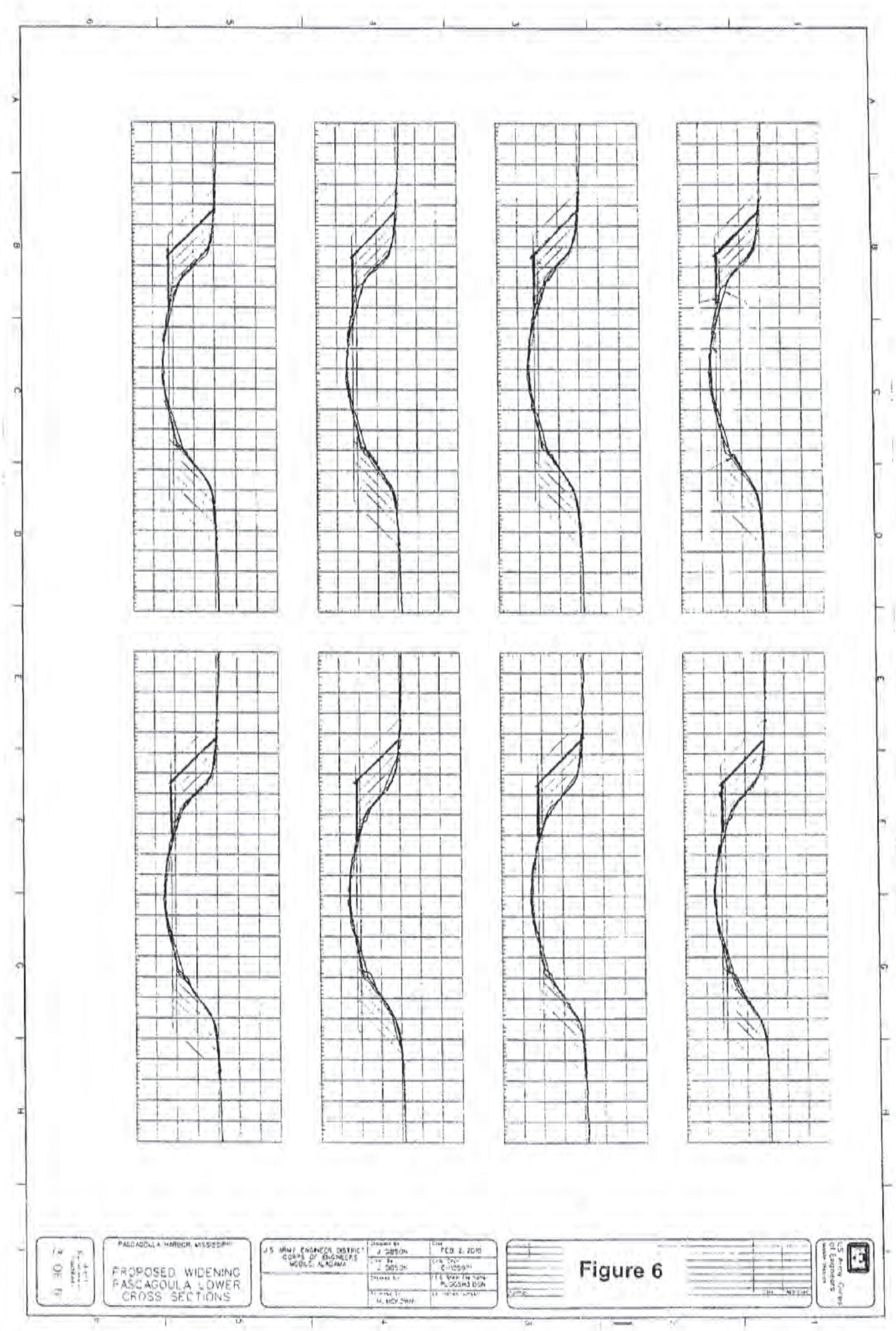

3 OF 6
PASCAGOULA HARBOR, MISSISSIPPI
PROPOSED WIDENING
BAYOU CASOTTE
CROSS SECTIONS
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA
J. GIBSON
FEB. 2, 2010
M. MCKOWN
US Army Corps of Engineers

Figure 5


PASCAGOULA HARBOR, MISSISSIPPI
PROPOSED WIDENING
PASCAGOULA LOWER
CROSS SECTIONS
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA
J. GIBSON
FEB. 2, 2010
Figure 6
US Army Corps
of Engineers

SUMMARY: Pursuant to the provisions of section 10 of Public Law 92–463, the Federal Advisory Committee Act, notice is hereby given that a closed meeting of the Department of Defense Wage Committee will be held on Tuesday, October 18, 2011, at 10 a.m. at 1400 Key Boulevard, Level A, Room A101, Rosslyn, Virginia 22209.

Under the provisions of section 10(d) of Public Law 92–463, the Department of Defense has determined that the meetings meet the criteria to close meetings to the public because the matters to be considered are related to internal rules and practices of the Department of Defense and the detailed wage data to be considered were obtained from officials of private establishments with a guarantee that the data will be held in confidence.

However, members of the public who may wish to do so are invited to submit material in writing to the chairman concerning matters believed to be deserving of the Committee's attention.

Additional information concerning the meetings may be obtained by writing to the Chairman, Department of Defense Wage Committee, 4000 Defense Pentagon, Washington, DC 20301–4000.

Dated: September 13, 2011.

Patricia L. Toppings,

OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 2011–23920 Filed 9–16–11; 8:45 am]

BILLING CODE 5001–06–P

DEPARTMENT OF DEFENSE

Department of the Air Force

Air University Board of Visitors Meeting

ACTION: Notice of Meeting of the Air University Board of Visitors.

SUMMARY: Under the provisions of the Federal Advisory Committee Act of 1972 (5 U.S.C., Appendix, as amended), the Government in the Sunshine Act of 1976 (5 U.S.C. 552b, as amended), and 41 CFR 102–3.150, the Department of Defense announces that the Air University Board of Visitors' meeting will take place on Tuesday, 4 October 2011, from 1:30 p.m. to approximately 2:30 p.m. The meeting will be a conference call meeting. Please contact Mrs. Diana Bunch, Designated Federal Officer, at (334) 953–4547, for further information to access the conference call. The purpose and agenda of this meeting is to provide independent advice and recommendations on matters pertaining to the strategic positioning of Air University's educational mission. Pursuant to 5 U.S.C. § 552b, as amended, and 41 CFR 102–3.155 all sessions of the Air University Board of Visitors' meeting will be open to the public. Any member of the public wishing to provide input to the Air University Board of Visitors should submit a written statement in accordance with 41 CFR 102–3.140(c) and section 10(a)(3) of the Federal Advisory Committee Act and the procedures described in this paragraph. Written statements can be submitted to the Designated Federal Officer at the address detailed below at any time. Statements being submitted in response to the agenda mentioned in this notice must be received by the Designated Federal Officer at the address listed below at least five calendar days prior to the meeting which is the subject of this notice. Written statements received after this date may not be provided to or considered by the Air University Board of Visitors until its next meeting. The Designated Federal Officer will review all timely submissions with the Air University Board of Visitors' Board Chairperson and ensure they are provided to members of the Board before the meeting that is the subject of this notice. Additionally, any member of the public wishing to attend this meeting should contact either person listed below at least five calendar days prior to the meeting for information on base entry passes.

FOR FURTHER INFORMATION CONTACT: Mrs. Diana Bunch, Designated Federal Officer, Air University Headquarters, 55 LeMay Plaza South, Maxwell Air Force Base, Alabama 36112–6335, telephone (334) 953–4547.

Bao-Anh Trinh,

DAF, Air Force Federal Register Liaison Officer.

[FR Doc. 2011–23925 Filed 9–16–11; 8:45 am]

BILLING CODE 5001–10–P

DEPARTMENT OF DEFENSE

Department of the Army, Corps of Engineers

Intent to Prepare an Environmental Impact Statement (EIS) for a Permit Application for Widening of Bayou Casotte and Lower Sound Channels of the Pascagoula Harbor Channel, in the Port of Pascagoula, Jackson County, Mississippi

AGENCY: U.S. Army Corps of Engineers, DOD.

ACTION: Notice of Intent.

SUMMARY: The U.S. Army Corps of Engineers (Corps) Mobile District Regulatory Division announces its intent to prepare an EIS to assess the potential environmental impacts associated with widening the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment of Pascagoula Harbor (the Project). The proposed Project is a 100-foot-widening of the Lower Sound and Bayou Casotte Legs of the Pascagoula Harbor Channel, as well as limited widening of the northern portion of the Horn Island Pass Channel to facilitate the transition between the two channel segments. The Corps is considering the Jackson County Port Authority/Port of Pascagoula (Port) application for a Department of the Army permit under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. A joint public notice for the Section 10 permit (SAM–2011–00389–PAH) was issued by the Corps on April 15, 2011.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and Draft EIS can be answered by Mr. Philip A. Hegji, Corps Project Manager, at (251) 690–3222. Comments shall be addressed to: U.S. Army Corps of Engineers, Mobile District, Regulatory Division, ATTN: File Number SAM–2011–00389–PAH, at P.O. Box 2288, Mobile, Alabama 36628–0001, or street address, 109 St. Joseph Street, Mobile, Alabama 36602.

SUPPLEMENTARY INFORMATION:

1. *Background.* The EIS will assess the impacts associated with dredging approximately 38,137 feet (7.22 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment to widen the channel 100 feet parallel to the existing channel centerline, to the existing depth of −42 feet mean lower low water, as well as the beneficial use and placement of the dredged material. The proposed project would be developed over approximately the next 2 to 3 years.

The EIS discussed in this notice would support the regulatory process for this specific permit application and Project. The Corps Planning Division is also preparing a separate EIS and Feasibility Study under the Corps Planning Process to evaluate whether there is a Federal interest in modifying the existing federally authorized navigation channel (Federal Navigation Channel) leading to Bayou Casotte (*i.e.,* Pascagoula channel widening from the Horn Island Pass to the entrance of the Bayou Casotte Harbor) and maintenance of the channel.

The primary Federal involvement in this EIS for the Regulatory Division is an application for a permit to dredge or excavate adjacent to a Federal Navigation Channel in or affecting navigable waters of the United States, and potential impacts on the human environment from such activities, as well as the disposal of material in the littoral disposal area, which could be suitable for beneficial use. Also included in the evaluation is the placement of dredged material within the U.S. Environmental Protection Agency (EPA) designated Pascagoula Ocean Dredged Material Disposal Site (ODMDS) and the designated Littoral Zone Placement Area located east and south of the barrier island. It is anticipated that the excavated area would become part of the Federal Navigation Channel in the future, if the Corps adopts maintenance of the widened area, pending approval of the Corps Planning documents described above. No wetland impacts are known to exist at the proposed dredge disposal site. In accordance with the National Environmental Policy Act (NEPA), the Corps is requiring the preparation of an Environmental Impact Statement (EIS) prior to rendering a final decision on the Port's permit application, based on potentially significant impacts to water quality, cultural resources, endangered or threatened species, or sediment transport. The Corps may ultimately make a determination to approve the permit, approve the permit with conditions, or deny the permit for the above project.

This effort will also support non-federal construction of the project and, in concert with the parallel Planning Division EIS, the potential federal maintenance under the authority of Section 204(b) of the Water Resources Development Act of 1986.

Pursuant to the National Environmental Policy Act of 1969 (as amended), the Corps will serve as Lead Agency for the Preparation of an EIS. The Draft EIS is intended to be sufficient in scope to address both the Federal and the state and local requirements and environmental issues concerning the proposed activities and permit approvals. The National Marine Fisheries Service (NMFS) has expressed interest in acting as a cooperating agency in the preparation of the EIS.

2. Project Purpose and Need. The overall project purpose is to widen the existing Federal Navigation Channel, including excavation, as needed, to reconfigure the site to alleviate the current transit restrictions and increase travel efficiencies for vessel transit, improve safety conditions for vessel operations, improve conditions for port operations, and improve habitat conditions through the beneficial use of dredged material.

3. Issues. There are several potential environmental issues that will be addressed in the EIS. Additional issues may be identified during the scoping process. Issues initially identified as potentially significant include:

a. Impacts to traffic, including marine navigation and ground transportation;
b. Potential impacts to endangered and threatened species;
c. Air quality;
d. Water quality;
e. Socioeconomic effects;
f. Cumulative impacts; and
g. Placement of dredged materials.

4. Alternatives. Alternatives initially being considered for the proposed improvement project include the following:

a. No Project/No Action. .This alternative would not implement any of the elements presented in the project description.

b. Widening 100 feet on the West Side. This alternative is the proposed Project to widen the Federal Channel segment approximately 100 feet parallel to the existing channel centerline, to the existing depth of −42 feet mean lower low water. The width may be increased as necessary to allow adequate transit for navigation in transition zones. The improved channel would be 7.22 miles long and result in excavation of approximately 3.4 to 3.8 million cubic yards of dredged material.

c. Widening of 50 feet on Either Side of the Channel Centerline. This alternative includes a proposal to widen the Federal Channel segment, approximately 50 feet on either side of the existing channel centerline, to the existing depth of −42 feet mean lower low water. The width may be increased as necessary to allow adequate transition for navigation. The improved channel would be similar in length and dredged material quantities to the proposed Project (widening 100 feet on the West Side).

5. Scoping Process. As part of the Corps Planning Division EIS, a public scoping meeting was conducted for the proposed Bayou Casotte and Lower Sound Channels Widening of the Pascagoula Harbor Channel. The meeting was held to receive public comments and assess public concerns regarding the appropriate scope and preparation of the Draft EIS. Participation in the public meeting by Federal, State, and local agencies and other interested organizations and persons was encouraged. This meeting was conducted in English, and was held on Thursday, February 25, 2010 from 5:30 p.m. to 7:30 p.m., located at the Pascagoula Public Library, 3214 Pascagoula Street, Pascagoula, MS 39567.

A comment period was held for the Regulatory Division on the permit application, which was noticed April 15, 2011. The comment period was held from April 15, 2011 to May 16, 2011.

The Corps will be accepting written comments on this Notice of Intent to prepare an EIS, and they will be taken into consideration during development of the document. We encourage any additional comments from interested public, agencies, and local officials. Written and e-mailed comments to the Corps will be received until October 20, 2011. Written comments should be sent to the address below:

U.S. Army Corps of Engineers, Mobile District, Regulatory Division, c/o Philip A. Hegji, 109 St. Joseph Street, Mobile, Alabama 36628–0001, e-mail: *Philip.A.Hegji@usace.army.mil.*

6. Availability of the Draft EIS. The Corps expects the Draft EIS to be made available to the public in late spring 2012. A public hearing will be held during the public comment period for the Draft EIS.

Dated: September 9, 2011.

Craig J. Litteken,

Chief, Regulatory Division.

[FR Doc. 2011–23994 Filed 9–16–11; 8:45 am]

BILLING CODE P

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Senior Executive Service Performance Review Board

AGENCY: Defense Nuclear Facilities Safety Board.

ACTION: Notice.

SUMMARY: This notice announces the membership of the Defense Nuclear Facilities Safety Board (DNFSB) Senior Executive Service (SES) Performance Review Board (PRB).

DATES: *Effective Date:* September 19, 2011.

ADDRESSES: Send comments concerning this notice to: Defense Nuclear Facilities Safety Board, 625 Indiana Avenue, NW., Suite 700, Washington, DC 20004–2001.

FOR FURTHER INFORMATION CONTACT: Deborah Biscieglia by telephone at (202) 694–7041 or by e-mail at *debbieb@dnfsb.gov.*

SUPPLEMENTARY INFORMATION: 5 U.S.C. 4314(c)(1) through (5) requires each agency to establish, in accordance with regulations prescribed by the Office of Personnel Management, one or more

Federal Register / Vol. 77, No. 77 / Friday, April 20, 2012 / Notices 23669

DATES: Questions or written comments about the proposed action and DEIS should be provided by May 21, 2012.

ADDRESSES: Submit comments to Mr. Charles W. Seyle, US Army Corps of Engineers, Savannah District, ATTN: PD, Post Office Box 889, Savannah, GA 31402 or email: *CESAS-PD.SAS@usace.army.mil.* This Notice of Intent will be available on the internet at: *http://www.sas.usace.army.mil/.*

FOR FURTHER INFORMATION CONTACT: Mr. Charles W. Seyle at 912–652–6017.

SUPPLEMENTARY INFORMATION:
Background. The AIWW between Savannah, Georgia, and Fernandina, Florida, was initially authorized by the Congress in 1882. The River and Harbor Act of 1937 provided for a 7-foot protected route around St. Andrew Sound, Georgia, and for a 12-foot channel between Beaufort, South Carolina and Savannah, Georgia. In 1938, a 12-foot channel was authorized between Savannah and Fernandina, Florida. The widths of the AIWW were to be 90 feet in land cuts and 150 feet in open waters. In addition to providing for the 12-foot channel between Beaufort and Fernandina, Congress imposed upon local interests the responsibility to furnish all lands or easements necessary for the 7-foot St. Andrews Sound channel and all necessary rights-of-way and dredged sediment disposal areas for new work and subsequent maintenance of the 12-foot channel between Beaufort and Fernandina. Work on the 12-foot channel between Beaufort and Fernandina was completed in 1941.

Savannah District, US Army Corps of Engineers records provide historical dredging information between 1942 and 2011. These records show that many of the 36 defined AIWW reaches from Port Royal Sound, South Carolina, and the Georgia-Florida border are naturally 12 feet deep or deeper and have not required dredging since construction of the waterway in the 1940s. Twenty of the reaches require periodic dredging, and of these, five require dredging every 1 to 5 years. The southernmost Georgia reach is located near the U.S. Naval Submarine Base at Kings Bay, Georgia, and the Navy is responsible for maintaining this reach. Consequently, no Corps action will be analyzed in the DEIS for that reach.

During previous dredging events along several reaches of the AIWW, dredged material that was primarily fine-grained silt was pumped onto unconfined saltmarsh disposal sites or into existing confined saltmarsh disposal sites. Material that was primarily coarse-grained sand was deposited in approved open-water disposal areas. State natural resource agencies have requested that the Corps discontinue placement of fine-grained dredged material on unconfined saltmarsh sites. The proposed DEIS would examine unconfined sediment placement on saltmarsh sites and identify locations where it would no longer be used and where its use may still be the least damaging practicable disposal method. The DMMP proposes to use a combination of new and existing disposal sites, open-water placement of sandy dredged material, and ODMDS for disposal of AIWW dredged material over the next 20 years.

The DEIS will examine a wide range of environmental resource areas including, but not limited to, air quality, traffic, noise, biological resources, cultural resources, socio-economic resources, wetlands, land use, hazardous and toxic substances, and cumulative environmental effects.

Significant issues to be analyzed in the DEIS will include potential impacts to water quality, marine and estuarine resources, wetlands, endangered species, cultural resources, commercial maritime interests, and recreational boating. Additional resources and conditions may be identified as a result of the scoping process initiated by this Notice of Intent (NOI).

All reasonable alternatives will be analyzed in the DEIS. The range of alternatives will include, but are not limited to:

- No Action (status quo);
- Use existing confined dredged material containment areas;
- Use existing Ocean Dredged Material Disposal Sites;
- Establish new Ocean Dredged Material Disposal Sites;
- Construct new confined dredged material containment areas.

The DMMP will identify disposal alternatives for several of the critical reaches and the impacts of each of these alternatives will be analyzed in the DEIS. As a result of information developed during the DEIS scoping process, other alternatives may be considered. The DEIS will analyze each alternative's impact on the natural and cultural environments along the AIWW and the surrounding area. Mitigation measures to avoid or reduce environmental impacts will also be considered in the DEIS. The DEIS is presently scheduled for release in Summer 2012. However, this date may change. Notification of the availability of the document will be published in the **Federal Register** and local newspapers.

Scoping Process: The Corps of Engineers invites tribal, federal, state and local agencies and the public to participate in the scoping process for preparation of the DEIS. The scoping process will help identify additional reasonable alternatives, potential environmental impacts, and key issues of concern to be analyzed in the DEIS.

Dated: April 13, 2012.

William G. Bailey,

Chief, Planning Division, Savannah District, US Army Corps of Engineers.

[FR Doc. 2012–9578 Filed 4–19–12; 8:45 am]

BILLING CODE 3730–58–P

DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Public Hearing and Notice of Availability for the Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Jackson County, MS

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DOD.

ACTION: Notice of availability.

SUMMARY: On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application to the U.S. Army Corps of Engineers (Corps), Mobile District, Mississippi Department of Environmental Quality (MDEQ) and the Mississippi Department of Marine Resources (MDMR) for authorization to impact wetlands and other waters of the United States associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel (the proposed project). The proposed project is located in the Pascagoula Lower Sound/Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365° North, Longitude 88.556° West). The Corps prepared a Draft Environmental Impact Statement (DEIS) to assess the potential environmental impacts associated with the proposed project. The proposed project is the dredging of approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Channel segment to widen the channel from the Federally authorized width of 350 feet and depth of −42 feet mean lower low water (MLLW) (with 2 feet of allowable over-depth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of −42 feet MLLW. The proposed project would include the placement of approximately 3.35

million cubic yards of dredged material resulting from the channel modification.

DATES: The Corps will hold a public hearing to receive comments on the DEIS. The public hearing will be held May 10, 2012, 6 p.m., Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, Mississippi.

Written comments on the DEIS must be received no later than May 29, 2012.

Additional Information on how to submit comments is included in the (**SUPPLEMENTARY INFORMATION**) section.

FOR FURTHER INFORMATION CONTACT: Written and emailed comments to the Corps will be received until May 29, 2012. Correspondence concerning this Public Hearing should refer to Public Notice Number SAM–2011–00389–PAH and should be directed to the U.S. Army Engineer District, RD–C–M Attention: Mr. Philip Hegji, Post Office Box 2288, Mobile, Alabama 36628–0001, via email at *philip.a.hegji@usace.army.mil* or by phone at (251) 690–3222. We encourage any additional comments from interested public, agencies and local officials. For additional information about our Regulatory Program, please visit our web site at: *www.sam.usace.army.mil/rd/reg/.*

SUPPLEMENTARY INFORMATION: Availability of the Draft EIS: The DEIS will be made available to the public April 13, 2012. The public hearing will be held May 10, 2012, during the 45-day public comment period for the DEIS.

On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application to the U.S. Army Corps of Engineers (Corps), Mobile District, Mississippi Department of Environmental Quality (MDEQ) and the Mississippi Department of Marine Resources (MDMR) for authorization to impact wetlands and other waters of the United States associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel (the proposed project), Jackson County. The proposed project is located in the Pascagoula Lower Sound/Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365° North, Longitude 88.556° West).

The Corps prepared a Draft Environmental Impact Statement (DEIS) to assess the potential environmental impacts associated with the proposed project. The proposed project is the dredging of approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Channel segment to widen the channel from the Federally authorized width of 350 feet and depth of −42 feet mean lower low water (MLLW) (with 2 feet of allowable over-depth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of −42 feet MLLW. The proposed project would include the placement of approximately 3.35 million cubic yards of dredged material resulting from the channel modification.

The JCPA requested a Department of the Army (DOA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 103 of the Marine Protection, Research and Sanctuaries Act and Section 404 of the Clean Water Act, including a Section 404(b)(1) analysis to help ensure compliance. The Corps is the lead Federal agency for the preparation of this DEIS in compliance with the requirements of the National Environmental Policy Act (NEPA) and the President's Council on Environmental Quality regulations for implementing NEPA. The National Marine Fisheries Service and the U.S. Coast Guard are cooperating agencies for the preparation of the EIS. This application was advertised by 30-day Public Notice April 15, 2011.

On April 13, 2012, a copy of the DEIS will be available for public review. The DEIS is available to the public at: *www.sam.usace.army.mil/rd/reg.* Hardcopies of the DEIS are available upon request from Mr. Philip A. Hegji, Corps Project Manager (contact information below). This document is being circulated to resource agencies and interested members of the public for a 45-day comment period ending May 29, 2012.

A public hearing will be held at 7 p.m. Thursday, May 10, 2012, at the Grand Magnolia Ballroom at 3604 Magnolia Street, Pascagoula, Mississippi. The public hearing will be held to provide information about the proposed project and to receive public input and comments on the DEIS. The Corps invites full public participation to promote open communication on the issues surrounding the DEIS. In addition, participation by Federal, State, local agencies and other interested organizations is encouraged. Both oral and written statements will be accepted at the hearing. An informal open house will be held from 6 p.m. until 7 p.m. in the Grand Magnolia Ballroom to allow the public the opportunity to become familiar with the proposed project prior to the start of the formal hearing. Displays of the proposed project and associated impacts will be available. Representatives from the JCPA will be present to answer questions concerning the project and Corps representatives will be available to answer questions concerning the Corps regulatory process.

The public hearing will be conducted in English. Those in need of language interpreters should contact the Corps' Public Involvement consultant, Crouch Environmental Services at (713) 868–1043, by Thursday, May 3, 2012.

Any comments received at the hearing will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposed project. All comments will be considered in the final EIS pursuant to NEPA. Comments are also used to help determine the overall public interest of the proposed project. All comments must be received or postmarked by May 29, 2012 (19 days following the public hearing).

Dated: April 5, 2012.

Cindy J. House-Pearson,

Chief, Regulatory Division.

[FR Doc. 2012–9627 Filed 4–19–12; 8:45 am]

BILLING CODE 3720–58–P

DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Intent To Prepare an Environmental Impact Statement/Environmental Impact Report for the Encinitas and Solana Beach Shoreline Protection Project, San Diego County, CA

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DOD.

ACTION: Notice of Intent.

SUMMARY: The Los Angeles District intends to prepare an Environmental Impact Statement/Environmental Impact Report (EIS/EIR) to support a cost-shared feasibility study with the Cities of Encinitas and Solana Beach, CA, for shoreline protection along the coastline of these two cities. The purpose of the feasibility study is to evaluate alternatives for reducing shoreline erosion. The EIS/EIR will analyze potential impacts of the recommended plan and a range of alternatives for shoreline protection. Alternatives will include both structural and non-structural measures.

ADDRESSES: You may also submit your concerns in writing to the city or the Los Angeles District at the address below. Comments, suggestions, and requests to be placed on the mailing list for announcements should be sent to Larry Smith, U.S. Army Corps of Engineers, Los Angeles District, P.O. Box 532711, Los Angeles, CA 90053–2325, or email to *lawrence.j.smith@usace.army.mil.*

FOR FURTHER INFORMATION CONTACT: For further information contact Mr. Larry Smith, Project Environmental

Stakeholder and Public Official Mailing List

First Name	Last Name	Title/Position	Affiliation	Address	City	ST	Zip Code
Gregory E.	Pyle	Chief	Choctaw Nation of Oklahoma	P.O. Drawer 1210	Durant	OK	74702
Johnny	Jones	Councilman Ward 1	City of Gautier	3006 Gulf Haven Dr.	Gautier	MS	39553
Hurley Ray	Guillotte	Councilman Ward 2	City of Gautier	3330 Highway 90	Gautier	MS	39553
Gordon	Gollott	Councilman Ward 3	City of Gautier	1713 Pat Dr.	Gautier	MS	39553
Scott	Macfarland	Councilman Ward 4	City of Gautier	4212 Gautier-Vancleave Road P.O. Box 314	Gautier	MS	39553
Adam	Colledge	Councilman Ward 5	City of Gautier	8124 Meadowdale Dr.	Gautier	MS	39553
Mary	Martin	Councilwoman At Large	City of Gautier	5904 Martin Bluff Rd.	Gautier	MS	39553
Tommy	Fortenberry	Mayor	City of Gautier	3330 Hwy 90	Gautier	MS	39564
		Municipal Clerk Office	City of Moss Point	4412 Denny St.	Moss Point	MS	39563
Connie	Moran	Mayor	City of Ocean Springs	P.O. Box 1800	Ocean Springs	MS	39566-1800
Harold	Tillman, Jr.	Councilman At Large	City of Pascagoula	5208 Bay St.	Pascagoula	MS	39567
Robert	Stallworth, Sr.	Councilman Ward 1	City of Pascagoula	4207 N. Market St.	Pascagoula	MS	39567
George	Wolverton	Councilman Ward 2	City of Pascagoula	3721 Warwick St.	Pascagoula	MS	39581
Joe	Abston	Councilman Ward 3	City of Pascagoula	1306 Gallery St.	Pascagoula	MS	39581
Frank	Corder	Councilman Ward 4	City of Pascagoula	2403 King Ave.	Pascagoula	MS	39567
Jim	Milstead	Councilman Ward 5	City of Pascagoula	610 11th St.	Pascagoula	MS	39567
Robbie	Maxwell	Mayor	City of Pascagoula	603 Watts Ave.	Pascagoula	MS	39567
Connie	Rocko	Harrison County Board of Supervisors	District Five	P.O. Box Drawer CC	Gulfport	MS	39502
William	Martin	Harrison County Board of Supervisors	District Four	P.O. Box Drawer CC	Gulfport	MS	39502
W.S. “Windy”	Swetman	Harrison County Board of Supervisors	District One	P.O. Box Drawer CC	Gulfport	MS	39502
Martin	Ladner	Harrison County Board of Supervisors	District Three	P.O. Box Drawer CC	Gulfport	MS	39502
Kim	Savant	Harrison County Board of Supervisors	District Two	P.O. Box Drawer CC	Gulfport	MS	39502
Barry	Cumbest	District 1 Supervisor	Jackson County Board of Supervisors	P.O. Box 998	Pascagoula	MS	39568
Melton	Harris, Jr.	District 2 Supervisor	Jackson County Board of Supervisors	P.O. Box 998	Pascagoula	MS	39688
Mike	Mangum	District 3 Supervisor	Jackson County Board of Supervisors	P.O. Box 998	Pascagoula	MS	39668
John	McKay	District 5 Supervisor	Jackson County Board of Supervisors	P.O. Box 998	Pascagoula	MS	39568
Troy	Ross	District 4 Supervisor	Jackson County Board of Supervisors	P.O. Box 998	Pascagoula	MS	39568
		Director	Jackson County Board of Supervisors	P.O. Box 998	Pascagoula	MS	39568-0480
Cheryl B.	Smith	Chief	Jena Band of Choctaw Indians	P.O. Box 1406	Jena	LA	71342
Kenneth	Carleton	Tribal Archaeologist	Mississippi Band of Choctaw Indians	P.O. Box 6257	Choctaw	MS	39350
Kenneth	Gordon		Mississippi Natural Heritage Program	2148 Riverside Dr.	Jackson	MS	39202-1353
Margaret	Bretz		Mississippi Secretary of State’s Office	P.O. Box 136	Jackson	MS	39205-0136
Manly	Barton	District 109 Rep	Mississippi State Legislature	7905 Pecan Ridge	Moss Point	MS	39562
Billy	Broomfield	District 110 Rep	Mississippi State Legislature	4512 S. Hawkins St.	Moss Point	MS	39563
Charles	Busby	District 111 Rep	Mississippi State Legislature	907 Grant Ave.	Pascagoula	MS	39567
John O.	Read	District 112 Rep	Mississippi State Legislature	2396 Robert Hiram Dr.	Gautier	MS	39552
H.B.	Zuber, III	District 113 Rep	Mississippi State Legislature	429 Hanley Rd.	Ocean Springs	MS	39564

First Name	Last Name	Title/Position	Affiliation	Address	City	ST	Zip Code
Jeffrey S.	Guice	District 114 Rep	Mississippi State Legislature	2016 Bienville Blvd.	Ocean Springs	MS	39564
Ben L.	Briggs		Pascagoula City Hall	603 Watts Ave.	Pascagoula	MS	36605
Earl	Barby Sr.	Chairman	Tunica-Biloxi Tribe of Louisiana	P.O. Box 331	Marksville	LA	71351
Roger F.	Wicker	Senator	United States Senate	3118 Pascagoula St. Suite 179	Pascagoula	MS	39567
Thad	Cochran	Senator	United States Senate	113 Dirksen Senate Office Building	Washington	DC	20510
Jeff	Sessions	Senator	United States Senate	41 N Beltline Hwy #187	Mobile	AL	36608
Jeff	Sessions	Senator	United States Senate	495 Russell Senate Office Bldg.	Washington	DC	20510
Gregg	Harper	Representative	US House of Representatives	230 South Whitworth St.	Brookhaven	MS	39601
Alan	Nunnelee	Representative	US House of Representatives	P.O. Box 1012	Columbus	MS	39703
Steven M.	Palazzo	Representative	US House of Representatives	3118 Pascagoula St. Suite 181	Pascagoula	MS	39567
Bennie G.	Thompson	Representative	US House of Representatives	3607 Medgar Evers Blvd.	Jackson	MS	39213
Honorable Jo	Bonner	Representative	US House of Representatives	2236 Rayburn House Office Bldg.	Washington	DC	20515-0101
Gerald	Bassett		Southwind Construction Corporation	14648 Highway 41 N	Evansville	IN	47725
Kay	Friedlander			150 Orange Ave.	Fairhope	AL	36532
		SE Regional Office Protected Resources Division	National Marine Fisheries Service	263 13th Ave. S	St. Petersburg	FL	33701
			PBQ Inc.	P.O. Box 6244	Diamondhead	MS	39525
David	Nelson			P.O. Box 60	Bon Secour	AL	36511
Paul C.	Thompson			2650 Claudia Ln.	Theodore	AL	36582
Donald R.	Allee	Executive Director & CEO	Mississippi State Port Authority	P.O. Box 40	Gulfport	MS	39502
Slade	Hooks		Waterways Towing	P.O. Box 1821	Mobile	AL	36633
			Wolf Bay Watershed Watch	P.O. Box 63	Elberta	AL	36530
Jerry	Dixon		Midway Lumber Sales, Inc.	P.O. Box 7667	Spanish Fort	AL	36577
Bryan	Long			1000 Wyngate Parkway Suite 100	Woodstock	GA	30189
Henry R.	Hull, Jr.			134 Mangrove St.	Pass Christian	MS	39571
E.A.	Mink, Sr.			11795 Old Shipyard Rd.	Coden	AL	36523
Gerald O.	Binninger			926 Highway 90	Waveland	MS	39576
Larry T.	Manuel		Biloxi Port Commission	P.O. Drawer 1908	Biloxi	MS	39533
Frances	McLaney			306 Azalea Rd.	Mobile	AL	36609
		Department of Archives & History	Mississippi State Historic Preservation Officer	P.O. Box 571	Jackson	MS	39205-0571
			George R. Irvine Real Estate	P.O. Box 2717	Daphne	AL	36526-2717
Earl B.	Claiborne			3024 Woodland Ridge Blvd.	Baton Rouge	LA	70816
Joseph L.	Maher			P.O. Box 2672	Mobile	AL	36652

First Name	Last Name	Title/Position	Affiliation	Address	City	ST	Zip Code
John	Cirino		Cirino Consulting Service	244 Woodland Cir.	Ocean Springs	MS	39564
Dorothy C.	Bradley			423 Bayou Sara Ave.	Saraland	AL	36571
W.M.	Cagle, Jr.			P.O. Box 16765	Mobile	AL	36616
William	Rowell, Jr.		Mobile County Wildlife & Conservation	58 Kings Way	Mobile	AL	36608-2629
Charles	McConnel		McConnel Marine Services, Inc.	80 St. Michael St. Suite 312	Mobile	AL	36602
John M.	Ford			P.O. Box 1655	Pascagoula	MS	39567
Sherry	Surrette		Mississippi Natural Heritage Program	2148 Riverside Dr.	Jackson	MS	39202-1353
			Harrison Brothers Dry Dock & Repair Yard	P.O. Box 1843	Mobile	AL	36601
Terry D.	Cole	Director of Cultural Resources		P.O. Drawer 1210	Durant	OK	74702
James L.	Noles, Jr.		Balch & Bingham	P.O. Box 306	Birmingham	AL	35201
Mr. & Mrs.	Sager			415 3rd Ave.	Pass Christian	MS	39571
			Jackson County Courthouse	P.O. Box 998	Pascagoula	MS	39568
Allen	Moeller		Jackson County Port Authority	P.O. Box 70	Pascagoula	MS	39568-0070
			Martin O'Neal Investments	502 Highway 13	Wiggins	MS	39577
			The Sun Herald	P.O. Box 4567	Biloxi	MS	39535-4567
			City of Pascagoula	P.O. Drawer 908	Pascagoula	MS	39568
			Post Master	911 Jackson Ave.	Pascagoula	MS	39567-9998

Stakeholder Letter

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

CESAM-RD-C **3 April 2012**
PUBLIC NOTICE NO: SAM-2011-00389-PAH

PUBLIC NOTICE
U.S. ARMY CORPS OF ENGINEERS

NOTICE OF PUBLIC HEARING AND AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED WIDENING OF THE PASCAGOULA LOWER SOUND/BAYOU CASOTTE CHANNEL, JACKSON COUNTY, MISSISSIPPI

TO WHOM IT MAY CONCERN:

On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application to the U.S. Army Corps of Engineers (Corps), Mobile District, Mississippi Department of Environmental Quality and the Mississippi Department of Marine Resources for authorization to impact wetlands and other waters of the United States associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel (the proposed project), Jackson County. The proposed project is located in the Pascagoula Lower Sound/Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365° North, Longitude 88.556° West).

The Corps prepared a Draft Environmental Impact Statement (DEIS) to assess the potential environmental impacts associated with the proposed project. The proposed project is the dredging of approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Channel segment to widen the channel from the Federally authorized width of 350 feet and depth of -42 feet mean lower low water (MLLW) (with 2 feet of allowable over-depth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of -42 feet MLLW. The proposed project would include the placement of approximately 3.35 million cubic yards of dredged material resulting from the channel modification.

On April 13, 2012, a copy of the DEIS will available for public review**.** The DEIS is available to the public at: www.sam.usace.army.mil/rd/reg. Hardcopies of the DEIS are available upon request from Mr. Philip A. Hegji, Corps Project Manager (contact information below). This document is being circulated to resource agencies and interested members of the public for a 45-day comment period ending May 29, 2012.

A public hearing will be held at 7:00 p.m. Thursday, May 10, 2012, at the Grand Magnolia Ballroom at 3604 Magnolia Street, Pascagoula, Mississippi 39567, as indicated on the enclosed map. The public hearing will be held to provide information about the proposed project and to receive public input and comments on the DEIS. The Corps invites full public participation to promote open communication on

CESAM-RD-C **2 April 2012**
NOTICE: SAM-2011-00389-PAH

the issues surrounding the DEIS. In addition, participation by Federal, State, local agencies and other interested organizations is encouraged. Both oral and written statements will be accepted at the hearing. An informal open house will be held from 6:00 p.m. until 7:00 p.m. in the Grand Magnolia Ballroom to allow the public the opportunity to become familiar with the proposed project prior to the start of the formal hearing. Displays of the proposed project and associated impacts will be available. Representatives from the JCPA will be present to answer questions concerning the project and Corps representatives will be available to answer questions concerning the Corps regulatory process.

The public hearing will be conducted in English. Those in need of language interpreters should contact the Corps' Public Involvement consultant, Crouch Environmental Services (713) 868-1043, by Thursday, May 3, 2012.

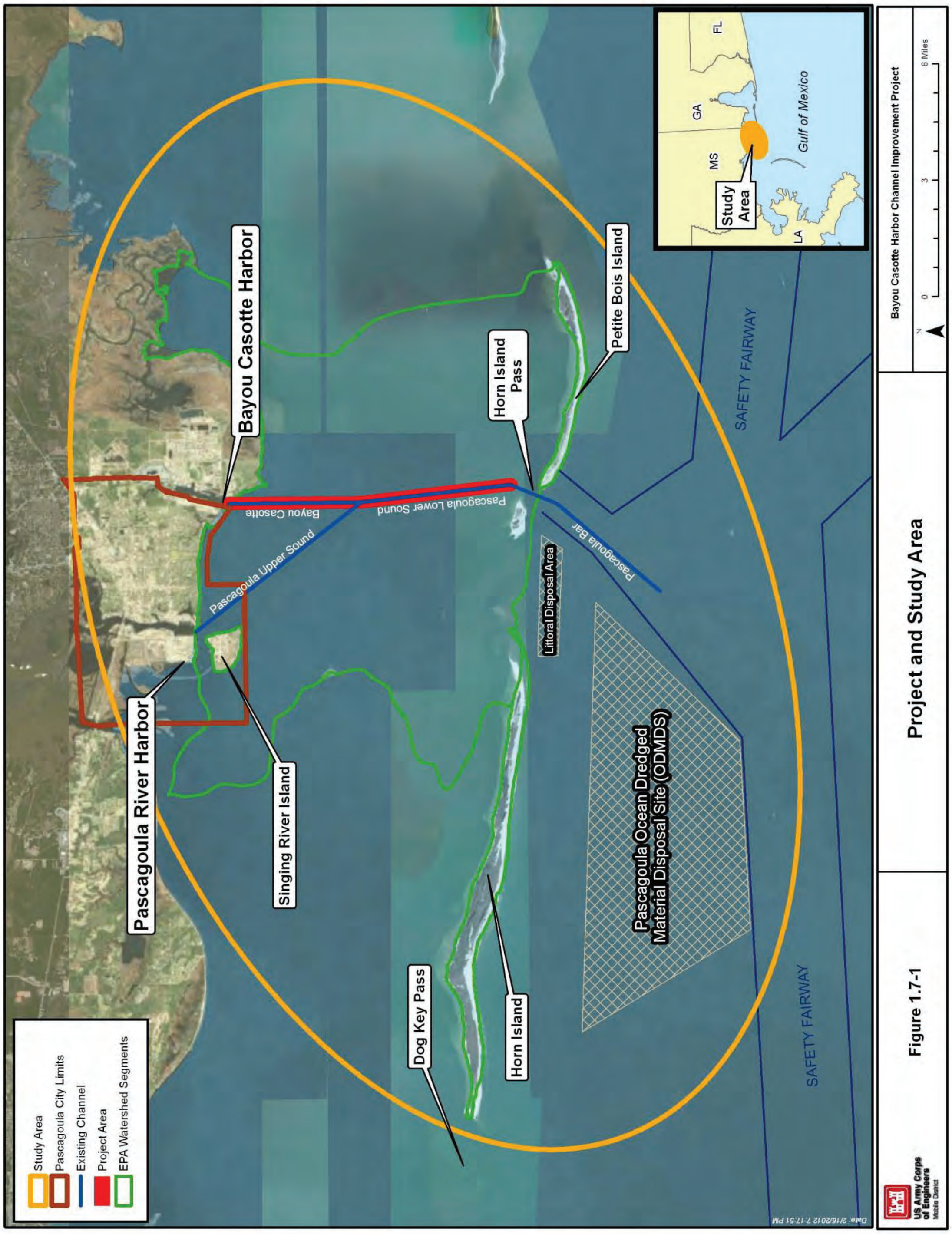
Any comments received at the hearing will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposed project. All comments will be considered in the final EIS pursuant to NEPA. Comments are also used to help determine the overall public interest of the proposed project. All comments must be received or postmarked by May 29, 2012, (19 days following the public hearing).

Correspondence concerning this Public Notice should refer to Public Notice **Number SAM-2011-00389-PAH** and should be directed to the District Commander, U.S. Army Engineer District, RD-C-M Attention: Mr. Philip Hegji, Post Office Box 2288, Mobile, Alabama 36628-0001.

If you have any questions concerning this publication, you may contact the Project Manager, Mr. Hegji via e-mail at philip.a.hegji@usace.army.mil or by phone at **(251) 690-3222**. Please refer to the Public Notice **SAM-2011-00389-PAH**. For additional information about our Regulatory Program, please visit our web site at: www.sam.usace.army.mil/rd/reg.

MOBILE DISTRICT
U.S. Army Corps of Engineers

CESAM-RD-C **2 April 2012**
NOTICE: SAM-2011-00389-PAH



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NOTICE: SAM-2011-00389-PAH

Directions to the **Grand Magnolia Ballroom**

From East Pascagoula or Kreole area:

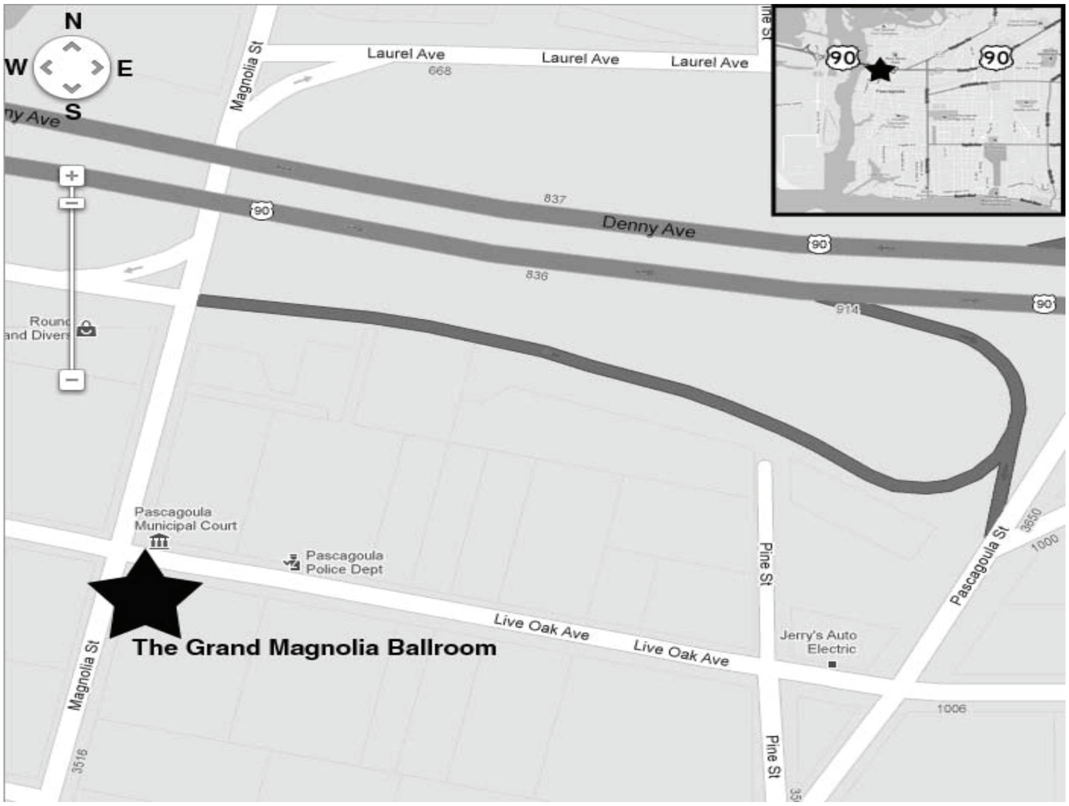
Proceeding WEST on Highway 90 (Denny Avenue). Turn LEFT onto Pascagoula Street. Turn RIGHT on Live Oak Avenue. The Grand Magnolia Ballroom is at the intersection of Magnolia Street and Live Oak Avenue across the street from the Pascagoula Municipal Court.

From Moss Point area:

Take Highway 613 SOUTH (Main Street/Telephone Road). Main Street becomes Telephone Road after crossing Jefferson Avenue. Continue SOUTH on Telephone Road to Market Street. Turn LEFT onto Market Street. Cross Denny Avenue (Highway 90). Turn LEFT onto Live Oak Avenue from Market Street. Cross Pascagoula Street on Live Oak Avenue. The Grand Magnolia Ballroom is at the intersection of Magnolia Street and Live Oak Avenue across the street from the Pascagoula Municipal Court.

Address is as follows:
The Grand Magnolia Ballroom
3604 Magnolia Street
Pascagoula, Mississippi 39567

CESAM-RD-C **2 April 2012**
NOTICE: SAM-2011-00389-PAH



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Newspaper Advertisements

Publication	Date	Affidavit Page Number
Mississippi Press	April 8, 2012	A29
Sun Herald	April 8, 2012	A30
Mississippi Press	April 25, 2012	A31
Sun Herald	April 25, 2012	A32

PRESS-REGISTER

LEGAL AFFIDAVIT

CROUCH ENVIRONMENTAL SERVICES INC
402 TEETSHORN STREET
HOUSTON, TX 77009

Name:CROUCH ENVIRONMENTAL

Account Number:1144373

Ad Number:0001852297

Sales Rep: Christine Bevins
251-219-5000

Billing Inquiries Please Call: (251) 219-5424

Date	Position	Description	P.O. Number	Ad Size	Total Cost
04/08/2012	Legals-Mississippi	CESAM RD-C 3 April 2012 PUBLIC NOTICE N		788 WDS	94.56

Mecia Carlson being sworn, says that she is bookkeeper of the Press-Register which publishes a daily newspaper in the City of Pascagoula and County of Jackson, State of Mississippi:

The attached notice appeared in the issue of

Mississippi Press04/08/2012

Mecia Carlson

Sworn to and subscribed before me this 9th day of April 2012

Doris A Norris

NOTARY PUBLIC

FOR QUESTIONS CONCERNING THIS AFFIDAVIT, PLEASE CALL MECIA CARLSON AT (251) 219-5418. YOU CAN PLACE A LEGAL NOTICE BY EMAIL OR FAX: MSLEGALS@PRESS-REGISTER.COM OR FAX# (251) 219-5037

STATE OF MISSISSIPPI
DORIS G. NORRIS
NOTARY PUBLIC
ID No. 28588
Commission Expires
February 22, 2016
GEORGE COUNTY

CESAM RD-C 3 April 2012

PUBLIC NOTICE NO:SAM-2011-00389-PAH

PUBLIC NOTICE
U.S. ARMY CORPS OF ENGINEERS

NOTICE OF PUBLIC HEARING AND AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED WIDENING OF THE PASCAGOULA LOWER SOUND/BAYOU CASOTTE CHANNEL, JACKSON COUNTY, MISSISSIPPI

TO WHOM IT MAY CONCERN:

On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application to the U.S. Army Corps of Engineers (Corps), Mobile District, Mississippi Department of Environmental Qualityand the Mississippi Department of Marine Resources for authorization to impact wetlands and other waters of the United States associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel (the proposed project), Jackson County. The proposed project is located in the Pascagoula Lower Sound/Bayou Casotte, Pascagoula, Jackson County, Mississippi (Latitude 30.365 degrees North, Longitude 88.556degrees West).

The Corps prepared a Draft Environmental Impact Statement (DEIS) to assess the potential environmental impacts associated with the proposed project. The proposed project is the dredging of approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Channel segment to widen the channel from the Federally authorized width of 350 feet and depth of -42 feet mean lower low water (MLLW) (with 2 feet of allowable over-depth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of -42 feet MLLW. The proposed project would include the placement of approximately 3.4 million cubic yards of dredged material resulting from the channel modification.

The JCPA requested a Department of the Army (DOA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 103 of the Marine Protection, Research and Sanctuaries Act and Section 404 of the Clean Water Act,including a Section 404(b)(1) analysis to help ensure compliance. The Corps is the lead Federal agency for the preparation of this DEIS in compliance with the requirements of the National Environmental Policy Act (NEPA) and the President's Council on Environmental Quality regulations for implementing NEPA. The National Marine Fisheries Service and the U.S. Coast Guard are cooperating agencies for the preparation of the EIS.This application was advertised by 30-day Public Notice on April 15, 2011.

On April 13, 2012, a copy of the DEIS will be made available for public review.The DEIS is available to the public at: www.sam.usace.army.mil/rd/reg.Hardcopies of the DEIS are available upon request from Mr. Philip A. Hegji, Corps Project Manager (contact information below).This document is being circulated to resource agencies and interested members of the public for a 45-day comment period ending May 29, 2012.

A public hearing will be held at 7:00 p.m. Thursday, May 10, 2012, at the Grand Magnolia Ballroom at 3604 Magnolia Street, Pascagoula, Mississippi 39567. The public hearing will be held to provide information about the proposed project and to receive public input and comments on the DEIS.The Corps invites full public participation to promote open communication on the issues surrounding the DEIS.In addition, participation by Federal, State, local agencies and other interested organizations is encouraged. Both oral and written statements will be accepted at the hearing. An informal open house will be held from 6:00 p.m. until 7:00 p.m. in the Grand Magnolia Ballroom to allow the public the opportunity to become familiar with the proposed project prior to the start of the formal hearing. Displays of the proposed project and associated impacts will be available. Representatives from the JCPA will be present to answer questions concerning the project and Corps representatives will be available to answer questions concerning the Corps regulatory process.

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Correspondence concerning this Public Notice should refer to Public Notice Number SAM-2011-00389-PAH and should be directed to the District Commander, U.S. Army Engineer District, RD-C-M Attention: Mr. Philip Hegji, Post Office Box 2288, Mobile, Alabama 36628 0001.

If you have any questions concerning this publication, you may contact the Project Manager, Mr. Hegji via e-mail at philip.a.hegji@usace.army.mil or by phone at(251) 690-3222. Please refer to the Public Notice SAM-2011-00389-PAH. For additional information about our Regulatory Program, please visit our web site at: www.sam.usace.army.mil/rd/reg.

MOBILE DISTRICT
U.S. Army Corps of Engineers

THE MISSISSIPPI PRESS
APRIL 8, 2012

PROOF OF PUBLICATION

STATE OF MISSISSIPPI
COUNTY OF HARRISON

Before me, the undersigned Notary of Harrison County, Mississippi personally appeared CRISTA LAUX who, being by me first duly sworn, did depose and say that she is a clerk of The Sun Herald, a newspaper published in the city Gulfport, in Harrison County, Mississippi, and the publication of the notice, a copy of which is hereto attached, has been made in said paper 1 times in the following numbers and on the following dates of such paper, viz:

Vol. 128 No., 188 dated 8 day of Apr, 20 12
Vol. ____ No., ____ dated ____ day of ____, 20 ____
Vol. ____ No., ____ dated ____ day of ____, 20 ____
Vol. ____ No., ____ dated ____ day of ____, 20 ____
Vol. ____ No., ____ dated ____ day of ____, 20 ____
Vol. ____ No., ____ dated ____ day of ____, 20 ____
Vol. ____ No., ____ dated ____ day of ____, 20 ____

Affiant further states on oath that said newspaper has been established and published continuously in said country for a period of more than twelve months next prior to the first publication of said notice.

Crista Laux
Clerk

Sworn to and subscribed before me this 3 day of May, A.D., 20 12

Kandi Berkley
Notary Public

STATE OF MISSISSIPPI ★ KANDI A BERKLEY NOTARY PUBLIC ID No. 80799 Comm. Expires April 05, 2014 HARRISON COUNTY

U.S. ARMY CORPS OF ENGINEERS
NOTICE OF PUBLIC HEARING AND AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED WIDENING OF THE PASCAGOULA LOWER SOUND/BAYOU CASOTTE CHANNEL, JACKSON COUNTY, MISSISSIPPI
TO WHOM IT MAY CONCERN:
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On April 13, 2012, a copy of the DEIS will be made available for public review. The DEIS is available to the public at: www.sam.usace.army.mil/rd/reg. Hardcopies of the DEIS are available upon request from
Mr. Philip A. Hegji, Corps Project Manager (contact information below). This document is being circulated to resource agencies and interested members of the public for a 45-day comment period ending May 29, 2012.
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MOBILE DISTRICT
U.S. Army Corps of Engineers
CESAMRD-C
PUBLIC NOTICE NO: SAM-2011-00389-PAH
ADV8,1SUN
1485573

PRESS-REGISTER

LEGAL AFFIDAVIT

CROUCH ENVIRONMENTAL SERVICES INC
402 TEETSHORN STREET
HOUSTON, TX 77009

Name:CROUCH ENVIRONMENTAL SERVICES INC

Account Number:1144373

Ad Number:0001854180

Sales Rep: Christine Bevins
251-219-5000

Billing Inquiries Please Call: (251) 219-5424

Date	Position	Description	P.O. Number	Ad Size	Total Cost
04/25/2012	Legals-Mississippi	PUBLIC NOTICE NO:SAM-2011-00389-PAH PUB		784 WDS	94.08

Mecia Carlson being sworn, says that she is bookkeeper of Press-Register which publishes a daily newspaper in the City of Pascagoula and County of Jackson, State of Mississippi:
with a general circulation in the counties of Baldwin and Mobile, State of Alabama
and attached notice appeared in the issue of

Mississippi Press04/25/2012

Mecia Carlson

Sworn to and subscribed before me this 25th day of April 2012

Doris A Norris

NOTARY PUBLIC

FOR QUESTIONS CONCERNING THIS AFFIDAVIT, PLEASE CALL MECIA CARLSON AT (251) 219-5418.
YOU CAN PLACE A LEGAL NOTICE BY EMAIL OR FAX:

STATE OF MISSISSIPPI
DORIS G. NORRIS
NOTARY PUBLIC
ID No. 28588
Commission Expires
February 22, 2016
GEORGE COUNTY

PUBLIC NOTICE NO:SAM-2011-00389-PAH

PUBLIC NOTICE
U.S. ARMY CORPS OF ENGINEERS

NOTICE OF PUBLIC HEARING AND AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED WIDENING OF THE PASCAGOULA LOWER SOUND/BAYOU CASOTTE CHANNEL, JACKSON COUNTY, MISSISSIPPI

TO WHOM IT MAY CONCERN:

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MOBILE DISTRICT
U.S. Army Corps of Engineers

THE MISSISSIPPI PRESS
APRIL 25, 2012

PROOF OF PUBLICATION

U.S. ARMY CORPS OF ENGINEERS
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MOBILE DISTRICT
U.S. Army Corps of Engineers
CESAMRD-C
PUBLIC NOTICE NO: SAM-2011-00389-PAH
ADV25,1WED
1486394

STATE OF MISSISSIPPI
COUNTY OF HARRISON

Before me, the undersigned Notary of Harrison County, Mississippi personally appeared CRISTA LAUX who, being by me first duly sworn, did depose and say that she is a clerk of The Sun Herald, a newspaper published in the city Gulfport, in Harrison County, Mississippi, and the publication of the notice, a copy of which is hereto attached, has been made in said paper 1 times in the following numbers and on the following dates of such paper, viz:

Vol. 128 No., 205 dated 25 day of Apr , 20 12
Vol. ____ No., ____ dated ____ day of ____ , 20 ____
Vol. ____ No., ____ dated ____ day of ____ , 20 ____
Vol. ____ No., ____ dated ____ day of ____ , 20 ____
Vol. ____ No., ____ dated ____ day of ____ , 20 ____
Vol. ____ No., ____ dated ____ day of ____ , 20 ____
Vol. ____ No., ____ dated ____ day of ____ , 20 ____

Affiant further states on oath that said newspaper has been established and published continuously in said country for a period of more than twelve months next prior to the first publication of said notice.

Crista Laux
Clerk

Sworn to and subscribed before me this 3 day of May, A.D., 20 12

STATE OF MISSISSIPPI
KANDI A. BERKLEY
NOTARY PUBLIC
ID No. 60796
Comm. Expires Apr. 05, 2014
HARRISON COUNTY

Kandi Berkley
Notary Public

News Release

NEWS RELEASE

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

For Immediate Release:
May 4, 2012

Contact:
Lisa Coghlan, 251-690-2505
Lisa.A.Coghlan@usace.army.mil

The Corps of Engineers Announces a Public Hearing for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel, Jackson County, Mississippi

MOBILE, Ala. – The U.S. Army Corps of Engineers Mobile District (Corps), in coordination with the Jackson County Port Authority (JCPA), will hold a public hearing on **Thursday, May 10, 2012, from 6 p.m. until 9 p.m.** at the Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, Miss., 39567. The purpose of this public hearing is to announce the availability of the Draft Environmental Impact Statement (DEIS) for the Bayou Casotte Harbor Improvement Project, and to share information about the DEIS and proposed alternatives. The Corps is the lead Federal agency for the preparation of this DEIS in compliance with the requirements of the National Environmental Policy Act (NEPA) and the President's Council on Environmental Quality regulations for implementing NEPA. The National Marine Fisheries Service and the U.S. Coast Guard are cooperating agencies for the preparation of the DEIS.

The Bayou Casotte Harbor Improvement Project is proposed to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the turning basin in Bayou Casotte. The project is intended to reconfigure the channel to alleviate the current transit restrictions and increase travel efficiencies for vessel transit. The project is also intended to improve conditions for port operations and maintain or improve the current level of safety for vessel operations under the improved conditions. The Corps prepared a DEIS to assess the potential environmental impacts associated with the proposed project.

The proposed project is the dredging of approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Channel segment to widen the channel from the Federally authorized width of 350 feet and depth of -42 feet mean lower low water (MLLW) (with 2 feet of allowable over-depth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing Federally authorized depth of -42 feet MLLW. The proposed project would include the placement of approximately 3.4 million cubic yards of dredged material resulting from the channel modification.

--more--

U.S. ARMY CORPS OF ENGINEERS MOBILE DISTRICT
PO Box 2288, Mobile, AL 36628-0001
WWW.SAM.USACE.ARMY.MIL

2-2-2-2 Notice of Availability and Public Hearing for Draft Environmental Impact Statement

The public hearing will be held to provide information about the proposed project and to receive public input and comments on the DEIS. The Corps invites full public participation to promote open communication on the issues surrounding the DEIS. In addition, participation by Federal, State, and local agencies, and other interested organizations is encouraged. Both oral and written statements will be accepted at the hearing. An informal open house will be held from 6 p.m. until 7 p.m. in the Grand Magnolia Ballroom to allow the public the opportunity to become familiar with the proposed project prior to the start of the formal hearing. During that time, displays of the proposed project and associated impacts will be available, and representatives from the JCPA will be present to answer questions concerning the project, and Corps representatives will be available to answer questions concerning the Corps regulatory process. Following the open house, the formal hearing will take place from 7 p.m. to 9 p.m.

Those who are unable to attend the public hearing may submit written comments by May 29, 2012 to:

U.S. Army Corps of Engineers, Mobile District
Regulatory Division
c/o Philip A. Hegji
PO Box 2288
Mobile, AL 36628-0001

Comments may also be submitted via e-mail to: CESAM-RD@sam.usace.army.mil. For more information about the project, please visit the website at www.sam.usace.army.mil/rd/reg/.

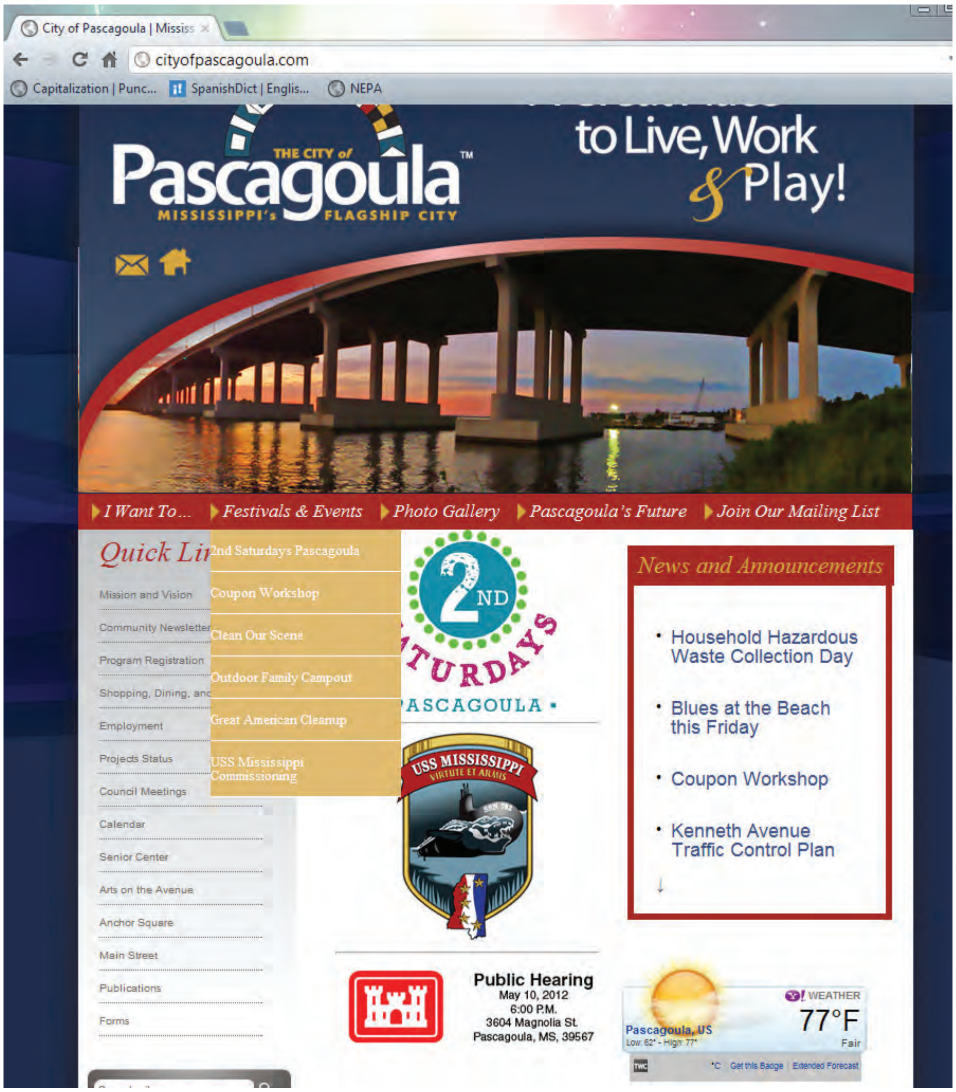
If any additional information is needed about the public hearing, contact Philip Hegji at 251-690-3222, or email CESAM-RD@sam.usace.army.mil. For all media queries please contact the Mobile District Public Affairs Office at 251-690-2505.

--30--

U.S. ARMY CORPS OF ENGINEERS MOBILE DISTRICT
PO Box 2288, Mobile, AL 36628-0001
WWW.SAM.USACE.ARMY.MIL

Web Banner

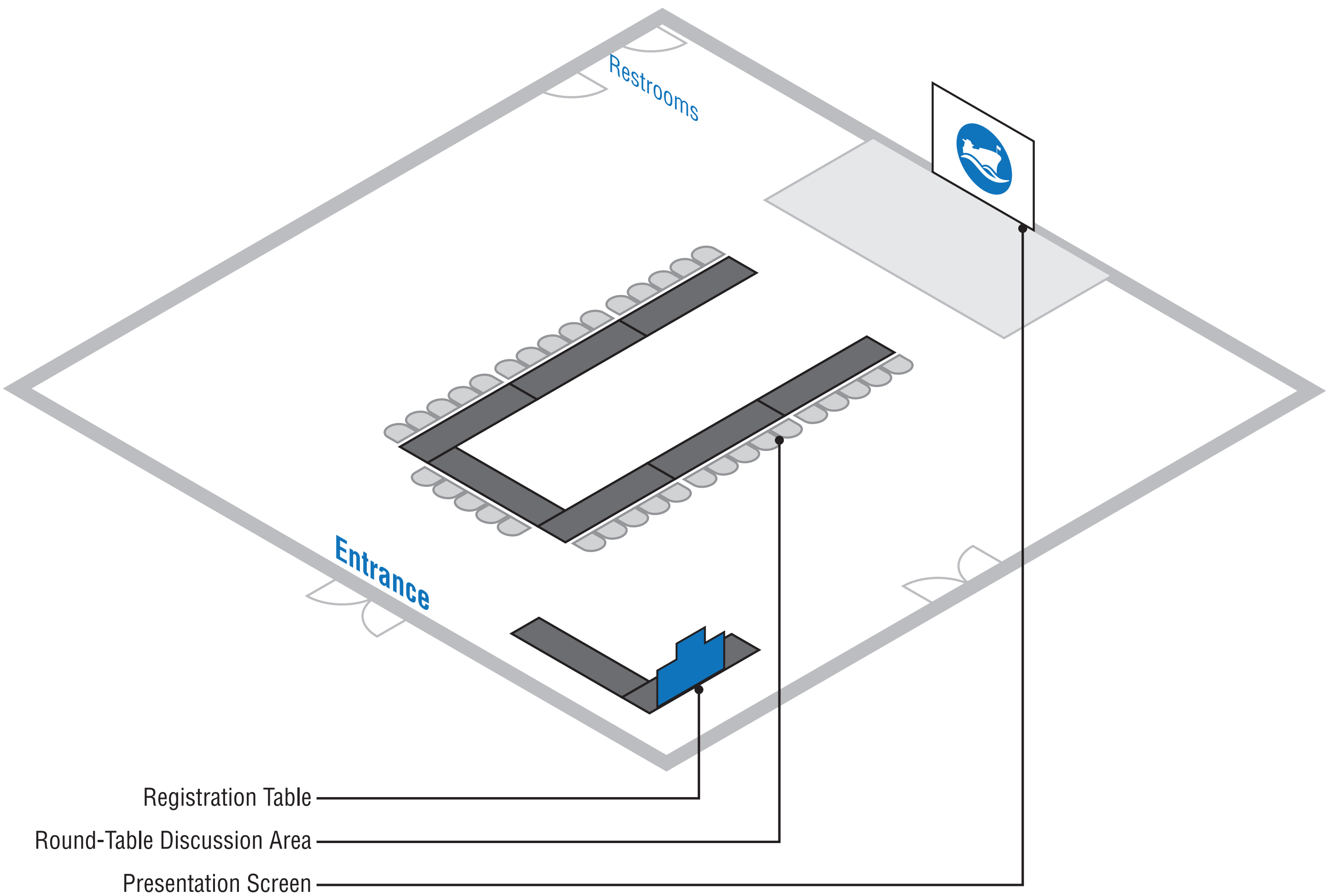
City of Pascagoula Website (www.cityofpascagoula.com)
Image captured April 13, 2012.



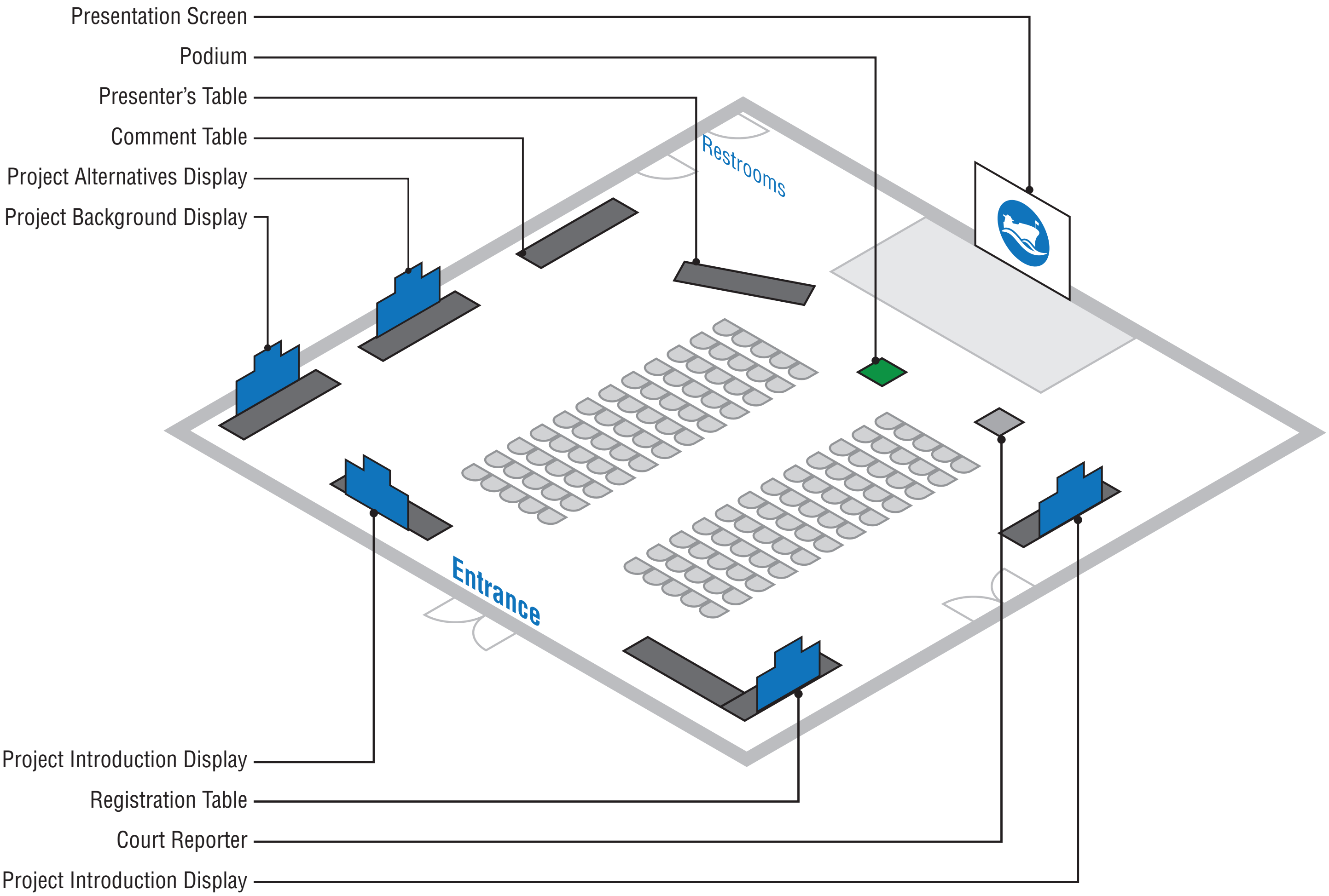
Appendix B: Public Hearing Facilitation

Agency Workshop Room Layout
Public Hearing Room Layout
Display Plan
Display Materials
Moderator's Speech
Applicant's Presentation Speech
Applicant's Slide Show Presentation

Agency Workshop Room Layout



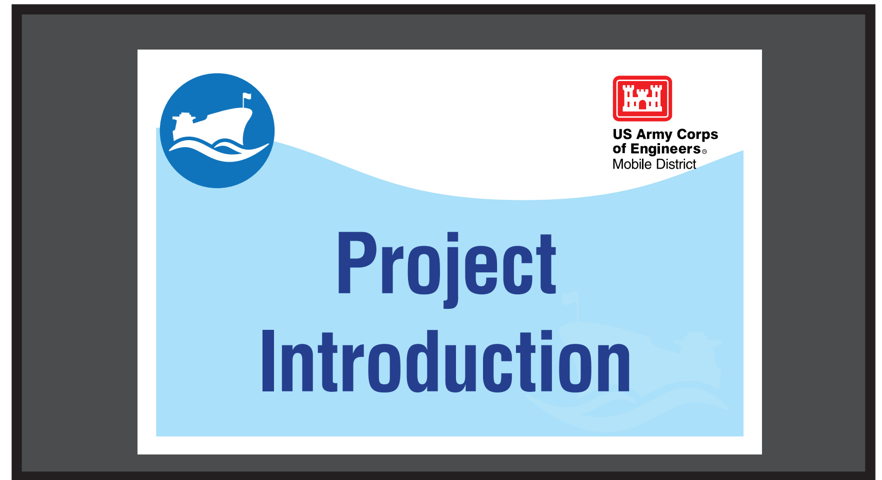
Public Hearing Room Layout



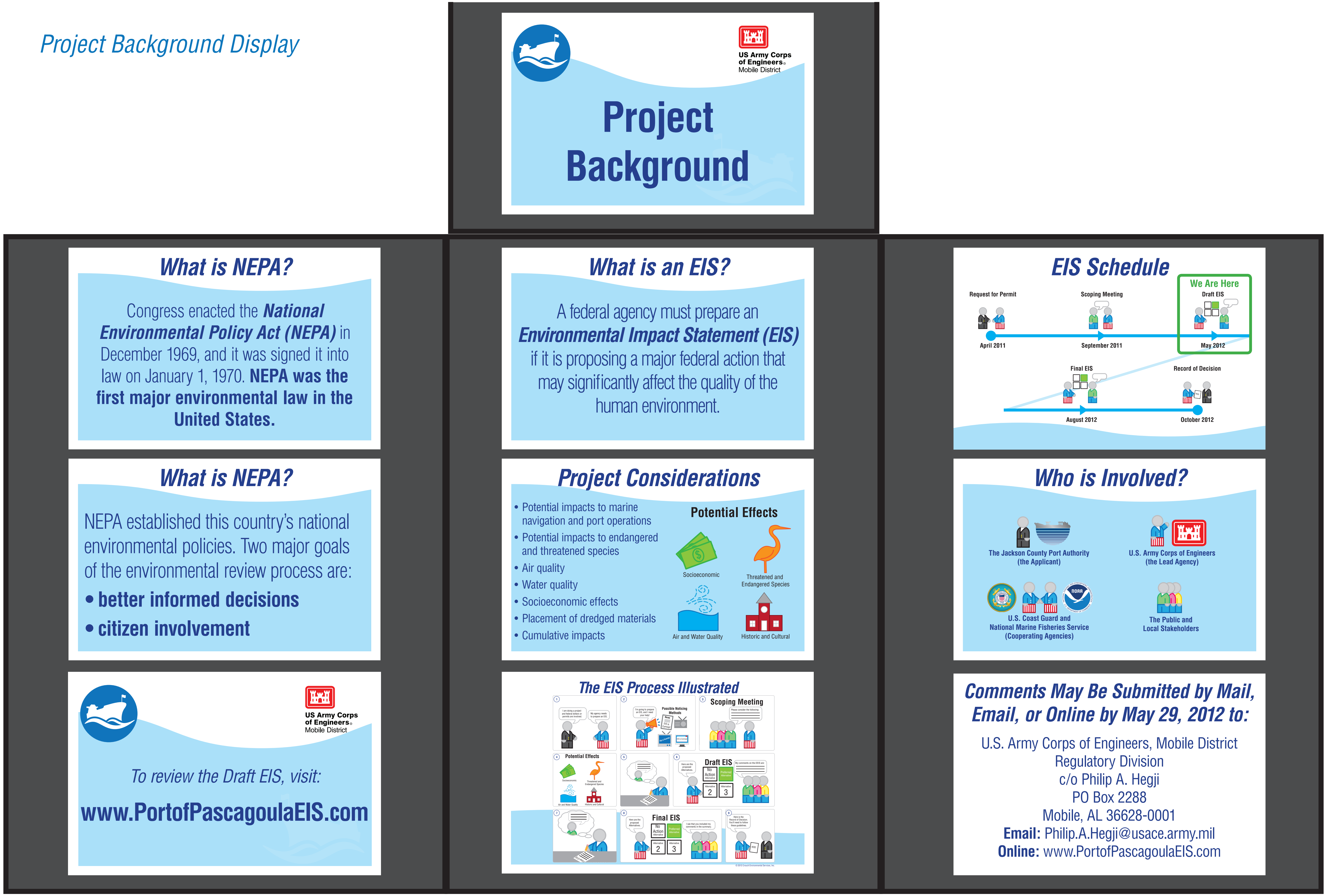
Display Plan

Registration Display

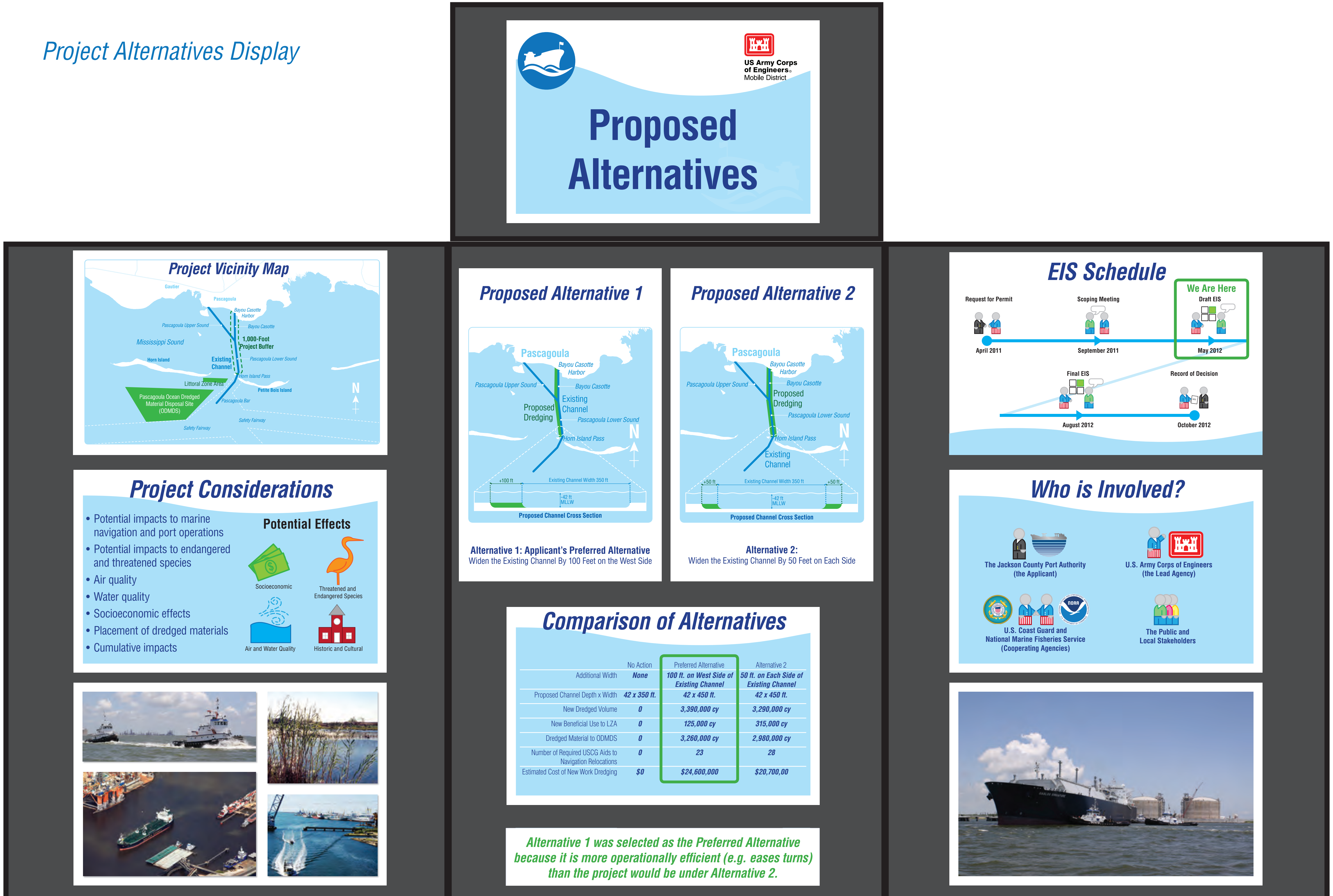
Project Introduction Display



Project Background Display



Project Alternatives Display



Display Materials

US Army Corps of Engineers®
Mobile District

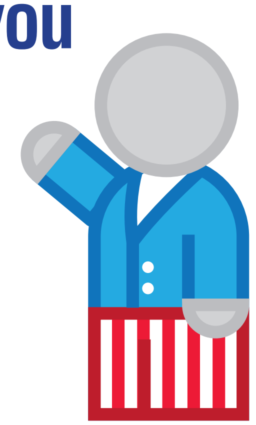
Draft Environmental Impact Statement for the Proposed Widening of the

Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

May 10, 2012

The U.S. Army Corps of Engineers Welcomes You to the Public Hearing for the Draft Environmental Impact Statement for the Proposed Channel Widening of the Pascagoula Lower Sound/Bayou Casotte Channel.

US Army Corps of Engineers®
Mobile District



Comments May Be Submitted by Mail, Email, or Online by May 29, 2012 to:

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Regulatory Division
c/o Philip A. Hegji
PO Box 2288
Mobile, AL 36628-0001
Email: Philip.A.Hegji@usace.army.mil
Online: www.PortofPascagoulaEIS.com

US Army Corps of Engineers®
Mobile District

To review the Draft EIS, visit:

www.PortofPascagoulaEIS.com

US Army Corps of Engineers®
Mobile District

Project Introduction

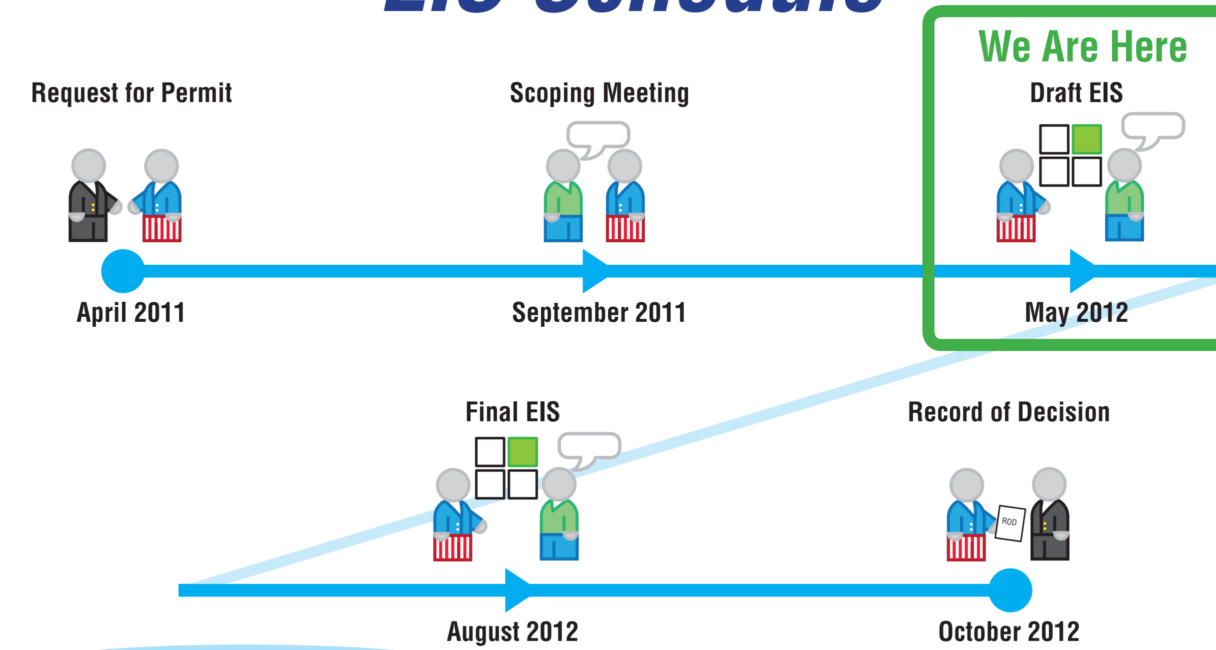
Fast Facts

Project type	Channel widening
Purpose	Improve port operations
Proposed location	Pascagoula Lower Sound/ Bayou Cassotte Channel

Purpose and Need

The **purpose of the proposed project** is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channel from Horn Island Pass to the turning basin in Bayou Casotte. The **current width of the channel imposes transit limitations** for marine vessel traffic that **delay vessels and fosters inefficient use** of the channels and harbor.

EIS Schedule



Purpose and Need

The proposed project is needed to **reduce present transit restrictions** along Pascagoula Lower Sound and Bayou Casotte navigation channel.

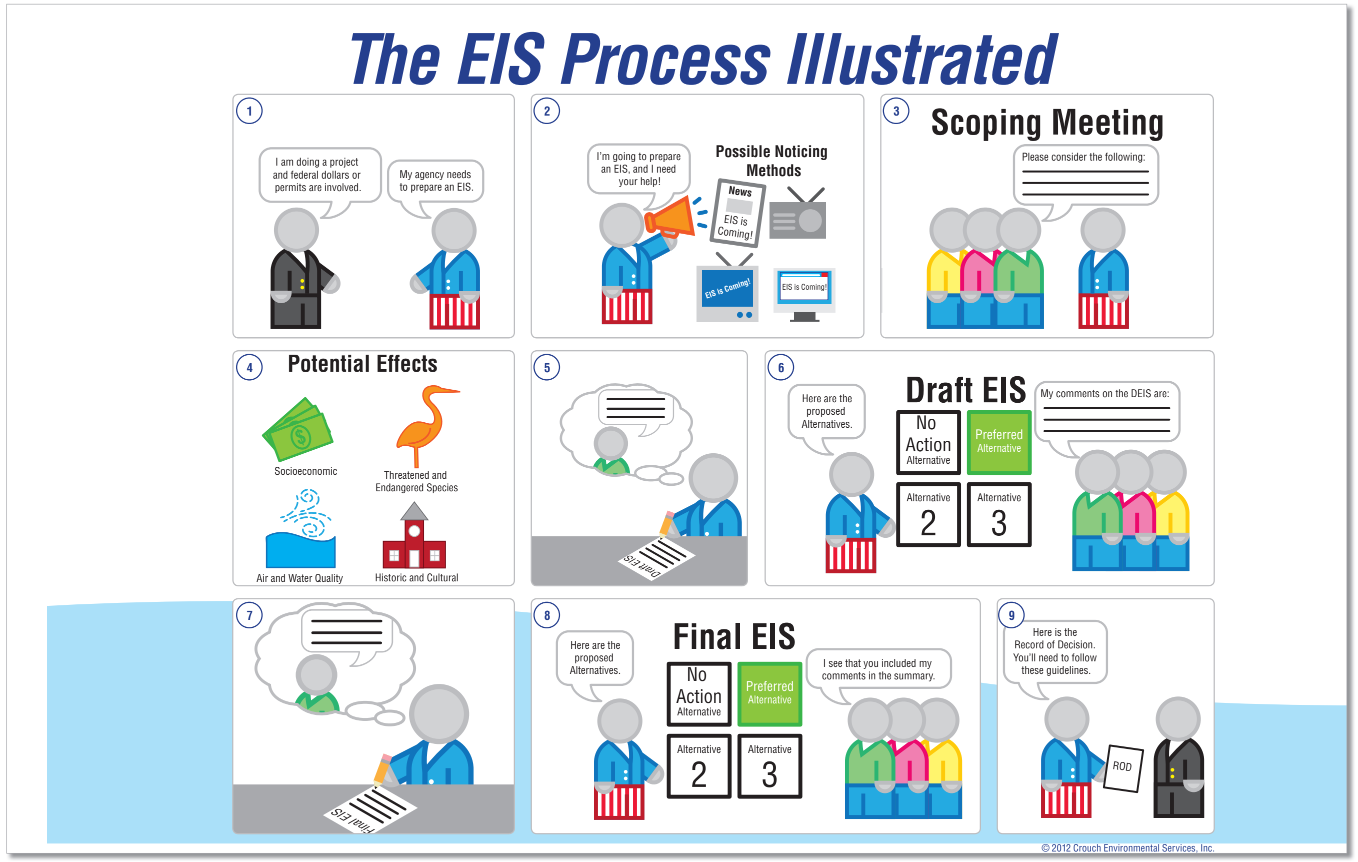
Who is Involved?

The Jackson County Port Authority
(the Applicant)

U.S. Army Corps of Engineers
(the Lead Agency)

U.S. Coast Guard and
National Marine Fisheries Service
(Cooperating Agencies)

The Public and
Local Stakeholders


The EIS Process Illustrated
1
I am doing a project and federal dollars or permits are involved.
My agency needs to prepare an EIS.
2
I'm going to prepare an EIS, and I need your help!
Possible Noticing Methods
News
EIS is Coming!
3
Scoping Meeting
Please consider the following:
4
Potential Effects
Socioeconomic
Threatened and Endangered Species
Air and Water Quality
Historic and Cultural
5
6
Here are the proposed Alternatives.
Draft EIS
No Action Alternative
Preferred Alternative
Alternative 2
Alternative 3
My comments on the DEIS are:
7
Final EIS
8
Here are the proposed Alternatives.
Final EIS
No Action Alternative
Preferred Alternative
Alternative 2
Alternative 3
I see that you included my comments in the summary.
9
Here is the Record of Decision. You'll need to follow these guidelines.
ROD
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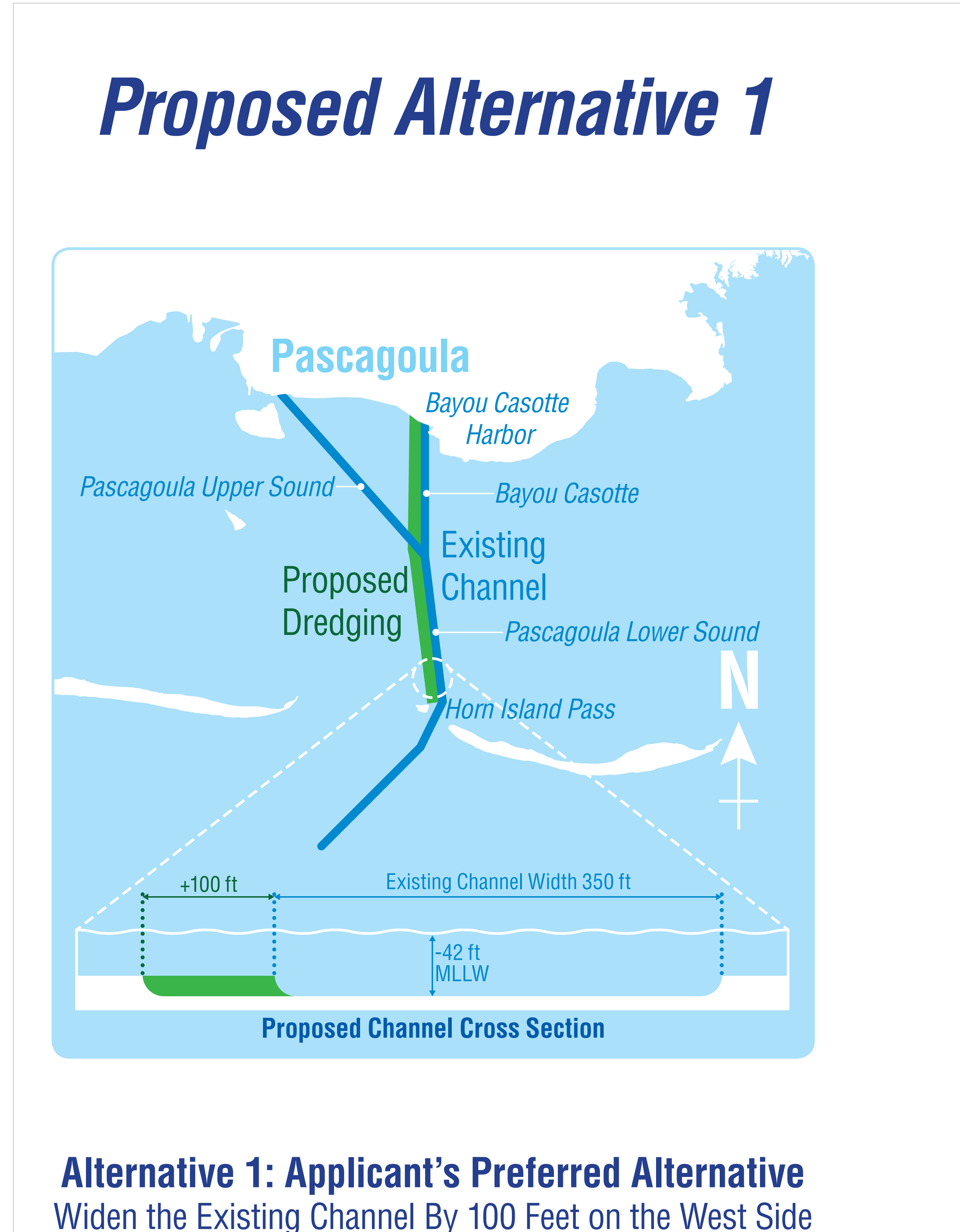
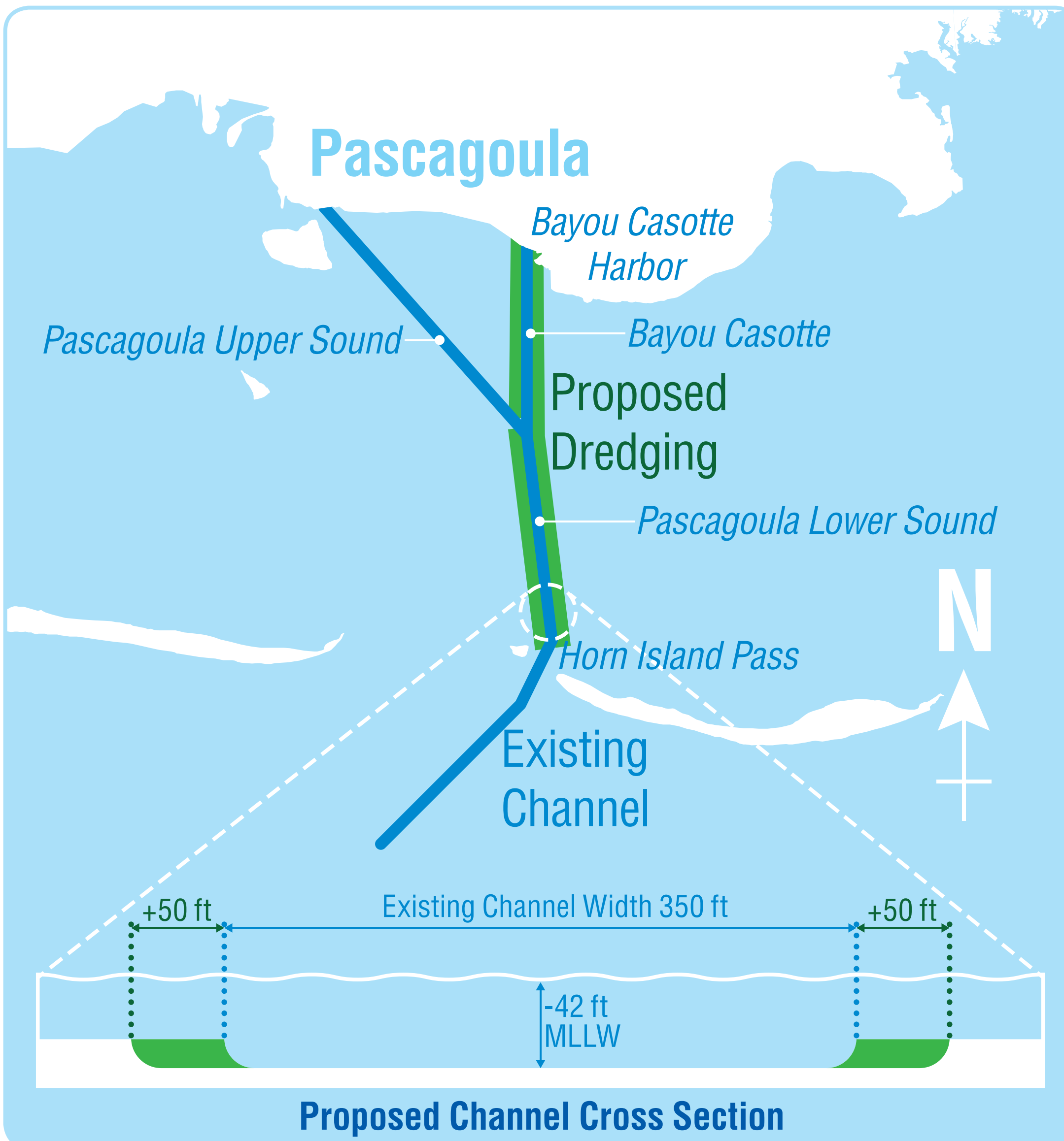
Mobile District
Proposed
Alternatives


Proposed Alternative 1
Pascagoula
Bayou Casotte Harbor
Pascagoula Upper Sound
Bayou Casotte
Existing Channel
Proposed Dredging
Pascagoula Lower Sound
Horn Island Pass
N
+100 ft
Existing Channel Width 350 ft
-42 ft MLLW
Proposed Channel Cross Section
Alternative 1: Applicant's Preferred Alternative
Widen the Existing Channel By 100 Feet on the West Side

Proposed Alternative 2



Alternative 2:
Widen the Existing Channel By 50 Feet on Each Side

Comparison of Alternatives

	No Action	Preferred Alternative	Alternative 2
Additional Width	***None***	***100 ft. on West Side of Existing Channel***	***50 ft. on Each Side of Existing Channel***
Proposed Channel Depth x Width	***42 x 350 ft.***	***42 x 450 ft.***	***42 x 450 ft.***
New Dredged Volume	***0***	***3,390,000 cy***	***3,290,000 cy***
New Beneficial Use to LZA	***0***	***125,000 cy***	***315,000 cy***
Dredged Material to ODMDS	***0***	***3,260,000 cy***	***2,980,000 cy***
Number of Required USCG Aids to Navigation Relocations	***0***	***23***	***28***
Estimated Cost of New Work Dredging	***$0***	***$24,600,000***	***$20,700,00***

Project Considerations

- Potential impacts to marine navigation and port operations
- Potential impacts to endangered and threatened species
- Air quality
- Water quality
- Socioeconomic effects
- Placement of dredged materials
- Cumulative impacts

Potential Effects

US Army Corps of Engineers®
Mobile District

Project Background

What is NEPA?

Congress enacted the ***National Environmental Policy Act (NEPA)*** in December 1969, and it was signed it into law on January 1, 1970. **NEPA was the first major environmental law in the United States.**

What is an EIS?

A federal agency must prepare an ***Environmental Impact Statement (EIS)*** if it is proposing a major federal action that may significantly affect the quality of the human environment.

What is NEPA?

NEPA established this country's national environmental policies. Two major goals of the environmental review process are:

- **better informed decisions**
- **citizen involvement**

Moderator’s Speech

OPENING REMARKS BY HEARING OFFICER

PUBLIC HEARING FOR THE BAYOU CASOTTE HARBOR IMPROVEMENT PROJECT
APPLICATION NUMBER SAM-2011-00389-PAH
May 10, 2012

Ladies and Gentlemen, welcome. This public hearing is called to order.

My name is Colonel Steven Roemhildt, I am the Commanding Officer for the Mobile District, U.S. Army Corps of Engineers.

The purpose to this hearing tonight is to acquire additional information which will be considered by the Corps in evaluating the permit application by the Jackson County Port Authority. We wish to obtain the views, opinions and comments of the public on the proposed project.

It is the policy of the Corps of Engineers to conduct our Regulatory Program in an atmosphere of public understanding, trust, and mutual cooperation and in a manner responsive to the public interest. In accordance with this policy, when we receive a permit application we seek the views of all persons concerned through various means of public involvement. Regulations provide that when evaluating a Department of the Army Permit Application and in this case, an Environmental Impact Statement, a public hearing must be held to gather comments and information from the public which will help in evaluating the project.

I ask that you please direct your comments and discussions to those issues involving the applicant's proposed activities which will be presented shortly. A final decision regarding this permit request will be made only after considering all information and comments, including the information provided here tonight, and evaluated in the Environmental Impact Statement process. A verbatim transcript will be made of this hearing. The transcript, written statements and other data submitted in connection with this hearing, as well as the previous public notice, will be made a part of the administrative record of this permit application. All written and oral statements received at this hearing will receive due consideration in the decision-making process.

Due to the number of persons who have expressed an interest in this application I ask that we follow certain ground rules. I urge persons desiring to make a point or points which have already been adequately presented by previous speakers to forego an oral statement and submit a written statement instead. If you wish to submit a written statement but do not have it prepared at this time, you may mail it to us. That address will be posted on the screen shortly. The deadline for written comments is the 29th of May for us to consider it in conjunction with the hearing.

I will place a 2 minute time limit on speakers due to the number that have indicated a desire to speak.

We will conduct the meeting in the following manner: First, I will ask the applicant, Mr. Allen Moeller, to make a short presentation outlining the Port’s latest proposal. Following that any elected officials or their representatives who are present and wish to make a statement may do so and then we will call on those of you who have indicated a desire to make a statement. Please step up to the microphone, clearly state your name, any affiliation you may have with a group or organization, and then provide your statement. This will insure we have correctly captured the remarks made tonight.

The people with me tonight are Ms. Cindy House-Pearson, Chief of the Regulatory Division; Mr. Philip Hegji, who is the project manager on this application; Mr. Allen Moeller, who is the Deputy Port Director; and Mr. Damon Young, who is our moderator.

I would now like to call upon the applicant to make a statement. Thank you.

Are there any elected government officials who would like to make a statement? Thank you.

I will now call on those of you who have indicated you wish to speak. I look forward to hearing your comments.

Applicant's Presentation Speech

Good Evening:

I'd like welcome everyone and thank you for your interest in this important project and for coming out tonight to learn more about the project and participating in this permitting process. We've been working on the channel widening project for more than three years, and this draft environmental impact statement represents a major milestone for the project.

Since there's a lot of information available at tonight's hearing on the planned improvements to the channel, I won't go into details of the project, but rather take a few couple of minutes to talk about the importance of the project for the Port of Pascagoula maritime community and all of Jackson County.

Pascagoula has a long maritime history and its prosperity has been tied to its accessibility to the Gulf of Mexico and world shipping lanes by an ever larger fleet of vessels. It's this accessibility which attracted major industry to build facilities in Pascagoula and permitted them to grow over the years. These channel dependent industries include Ingalls Shipbuilding, Chevron USA, VT Halter Marine, Signal International, Mississippi Phosphates, and most recently Gulf LNG Energy. It's this accessibility which allows us to host events such as the upcoming commissioning of the USS Mississippi, the Navy's newest fast attack submarine, on June 2.

As ships grew larger over the years, the Port saw the need to increase the width and depth of the channels to accommodate the modern fleet of tankers, military vessels, bulk carriers, and offshore drill rigs. Prior to this permit application, the most recent authorization of channel improvements for the Port of Pascagoula was more than 25 years ago in the Water Resources Development Act of 1986. Since that time most of the channel segments have been improved to their authorized limits. The last channel segment expected to be improved under the 1986 authorization is the widening of the entrance channel, which is planned for construction in 2013.

Something else that has happened over the years is an increased focus on safety and environmental responsibility – brought on in large part by a heightened awareness after the Exxon Valdez oil spill in 1989. We now have more transit restrictions based on ship size, time of day, and environmental conditions. Many vessels now utilize two ship pilots instead of one. Base line experience and training requirements for apprentice pilots became much more stringent. Greater depths are maintained under the vessels during transit. A data-buoy system has been installed which provides real-time wind and current information to mariners. Pascagoula has some of the most modern harbor tugs in the Gulf to assist ships safely to and from the docks.

The channel widening improvements which are the subject of tonight's public hearing are really about increasing the availability of the channel for port users by easing some of the transit restrictions, thereby reducing congestion and improving the operating efficiency of the channel, while maintaining or even improving the safety of those channel transits. Once constructed, the improved channel will provide current ship traffic better access to the port, and will provide additional capacity for future growth within the port.

We'd like to thank Col Rohemhildt and the Corps of Engineers for all of the work and coordination which got us to this stage of the process and, again, thank you for coming tonight. We look forward to receiving your comments on the project.

Applicant's Slide Show Presentation







Appendix C: Collateral Materials

Agency Workshop Agenda
Project Newsletter
Attendee Card
Comment Form

Agency Workshop Agenda

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO ATTENTION OF:

AGENCY WORKSHOP
Draft Environmental Impact Statement for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel

May 10, 2012

Location: The Grand Magnolia Ballroom
3604 Magnolia Street
Pascagoula, Mississippi 39567

Facilitators: Philip Hegji and Damon Young (USACE)

2:00 – Welcome and Introductions

2:15 – Review of Proposed Project
- Proposed Project Description (USACE)
- Proposed Project Background (The Jackson County Port Authority)

2:45 – Round-table Discussion
- Discussion of the Draft EIS
- Alternatives for the Proposed Project
- Potential Impacts of the Proposed Project

3:40 – Workshop Conclusion

4:00 – Adjourn

Project Newsletter

US Army Corps of Engineers®
Mobile District

Draft Environmental Impact Statement for the Proposed Widening of the

Pascagoula Lower Sound/Bayou Casotte Channel Jackson County, Mississippi

May 10, 2012

Welcome to the Public Hearing for the Draft Environmental Impact Statement

On April 6, 2011, the Jackson County Port Authority (JCPA) submitted an application to the U.S. Army Corps of Engineers (Corps), Mobile District, Mississippi Department of Environmental Quality, and the Mississippi Department of Marine Resources for authorization to discharge dredged materials associated with the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel into waters of the United States.

The JCPA requested a Department of the Army (DOA) permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 103 of the Marine Protection, Research and Sanctuaries Act and Section 404 of the Clean Water Act, including a Section 404(b)(1) analysis to ensure compliance with relevant regulations.

The Corps is preparing an Environmental Impact Statement (EIS) to assess the potential environmental impacts associated with the proposed project. The Corps is the lead federal agency for the preparation of this EIS in compliance with the requirements of the National Environmental Policy Act (NEPA) and the President's Council on Environmental Quality (CEQ) regulations for implementing NEPA.

The National Marine Fisheries Service and the U.S. Coast Guard are cooperating agencies for the preparation of the EIS. A cooperating agency is involved in the NEPA analysis because the agency has jurisdiction by law or special expertise with respect to environmental effects involved with the proposed action.

What's Inside:

- *Navigating NEPA* . . . . *Page 2*
- *The NEPA Process* . . . . *Page 4*
- *Project Vicinity Map* . . . . *Page 6*
- *Purpose and Need* . . . . *Page 6*
- *Proposed Alternatives* . . . . *Page 7*

The Current State of the Channel

The existing federally authorized channel dimensions are restrictive. Deep-draft vessels are restricted to one-way traffic, and vessels greater than 700 feet in length overall or greater than 36 feet in draft are confined to daylight travel. Additionally, wind and current conditions impose restrictions on travel in the existing channel.

Proposed Project

The proposed project is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the turning basin in Bayou Casotte. The proposed project would reduce existing channel and harbor restrictions, thereby improving operating conditions and efficiency in the channel and harbor. The proposed project would improve the capacity of the port to handle current and future marine vessel traffic in an economical and efficient manner.

The overall purpose of the proposed project would be to improve operating conditions and efficiency in the Pascagoula Lower Sound and Bayou Casotte channels and Bayou Casotte Harbor.

Navigating NEPA

What is NEPA and Why Do We Do It?

Congress enacted the National Environmental Policy Act (NEPA) in December 1969, and it was signed into law on January 1, 1970. NEPA was the first major environmental law in the United States, and it established this country's national environmental policies. To implement these policies, NEPA requires agencies to undertake an assessment of the environmental effects of their proposed actions prior to making decisions.

Two major goals of the environmental review process are:

- better informed decisions
- citizen involvement

NEPA applies when a federal agency has discretion to choose among one or more alternative means of accomplishing a particular goal.

For this project, the Corps is preparing an Environmental Impact Statement (EIS) to asses the effects of the proposed widening of the Pascagoula Lower Sound/Bayou Casotte Channel.

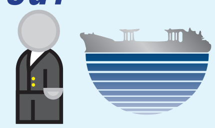
The EIS Process

A federal agency must prepare an EIS if it is proposing a **major federal action that may significantly affect the quality of the human environment.**

Scoping for the EIS occurs early in the process. This is the best time to identify issues, determine points of contact, establish project schedules, and provide recommendations to the agency leading the process. The overall goal is to define the scope of issues to be addressed in the analyses that will be included in the EIS.

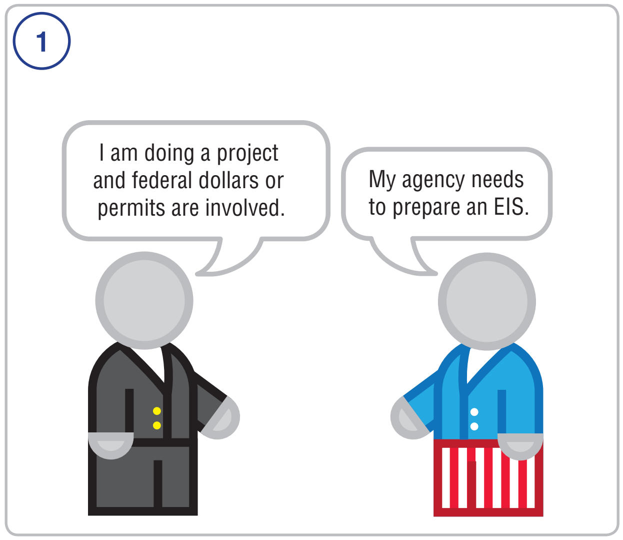
It is in the public's interest to become involved as soon as the EIS process begins, and to use the scoping opportunity to make thoughtful, rational comments on effects and alternatives. Some of the most constructive and beneficial interactions between the public and an agency occurs when citizens identify or develop reasonable alternatives that the agency can then evaluate in the EIS.

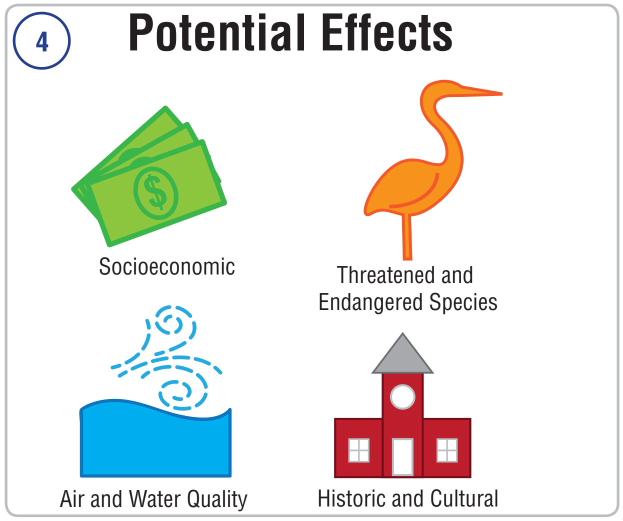
Who is Involved?



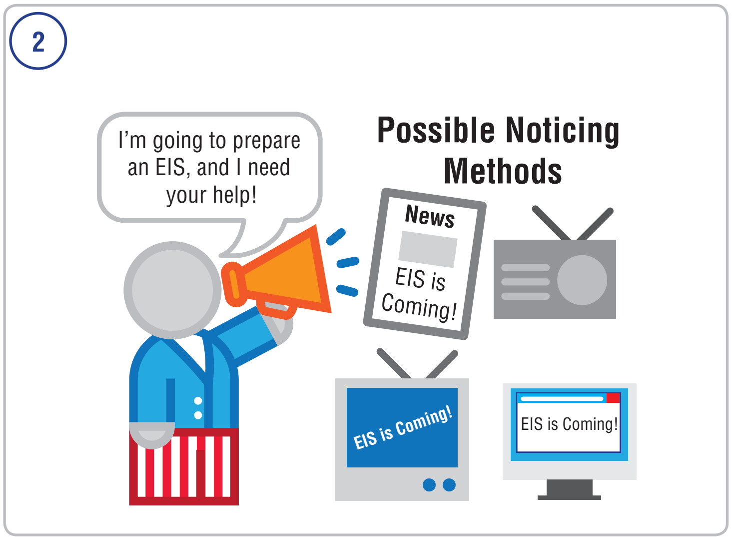
The Jackson County Port Authority
(the Applicant)

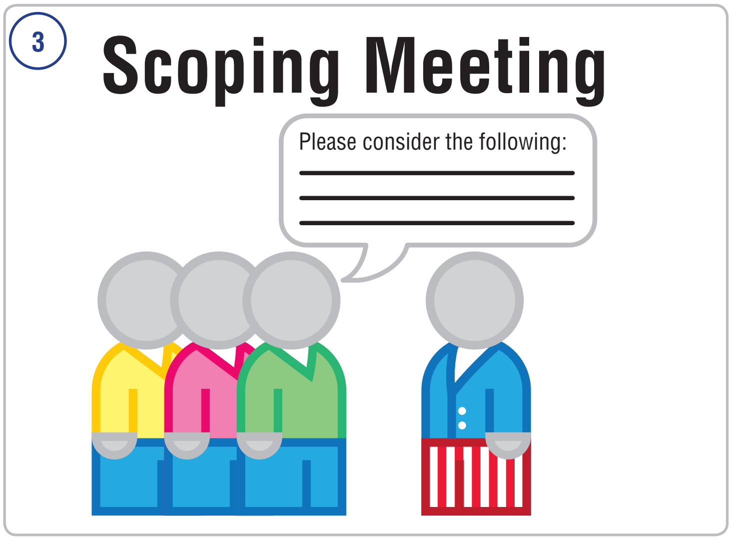
The EIS Process Illustrated






U.S. Army Corps of Engineers
(the Lead Agency)
U.S. Coast Guard and
National Marine Fisheries Service
(Cooperating Agencies)
The Public and
Local Stakeholders


2
I'm going to prepare an EIS, and I need your help!
Possible Noticing Methods
News
EIS is Coming!
EIS is Coming!
EIS is Coming!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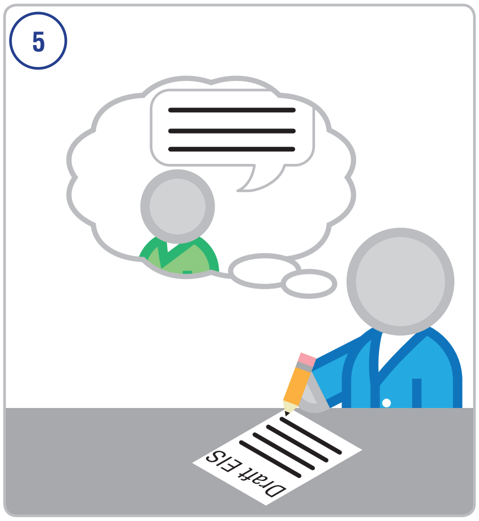
Scoping Meeting
Please consider the following: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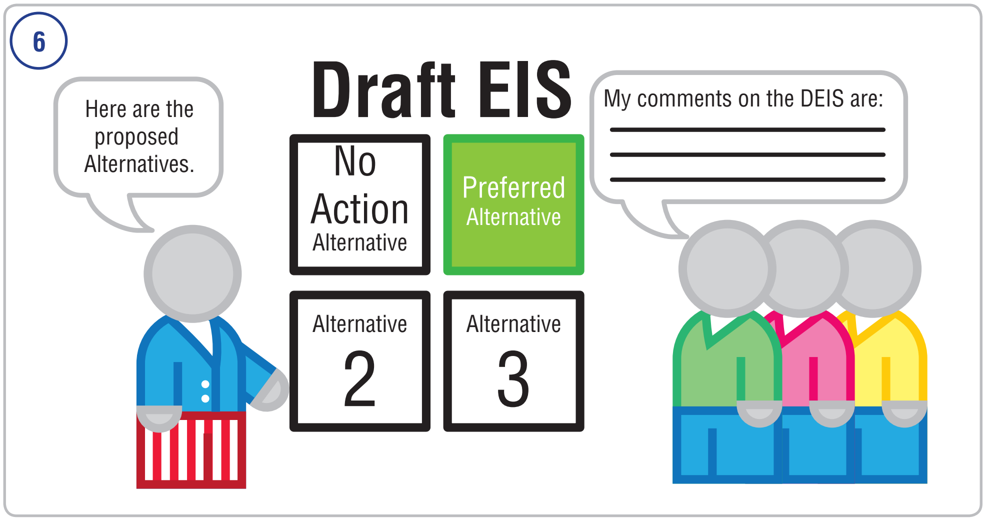
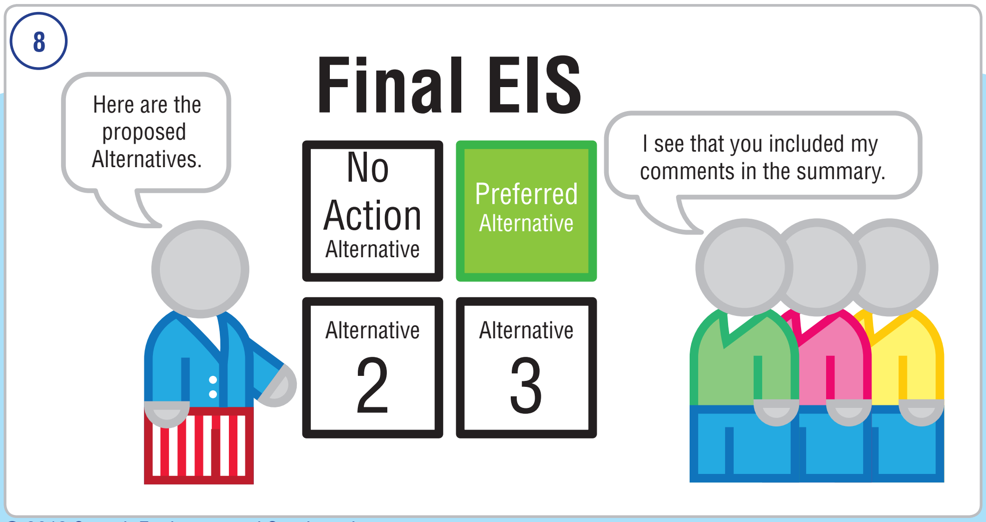
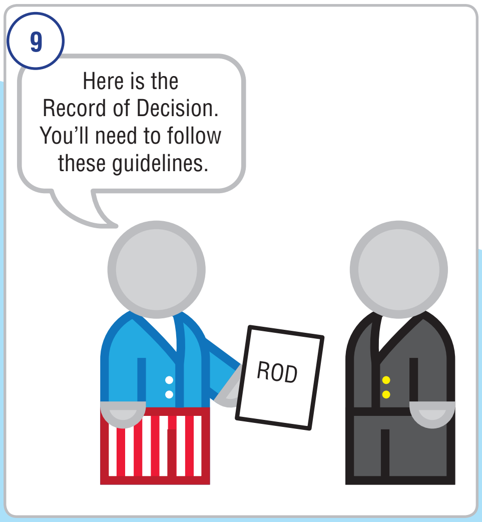
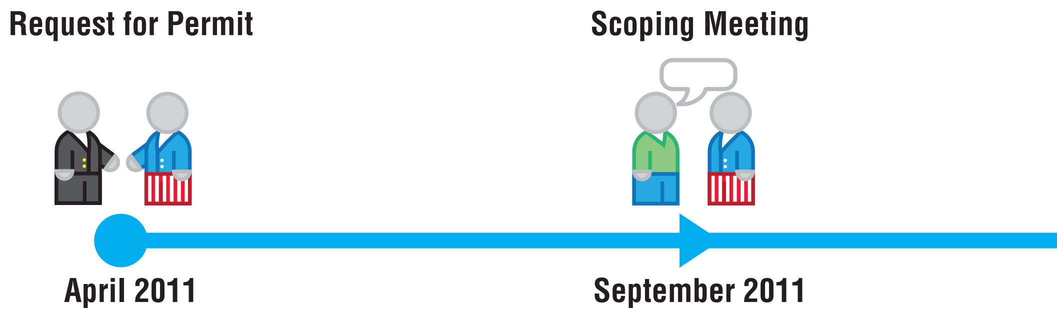
Draft EIS


6
Here are the proposed Alternatives.
Draft EIS
No Action Alternative
Preferred Alternative
Alternative 2
Alternative 3
My comments on the DEIS are:

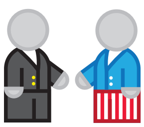

8
Here are the proposed Alternatives.
Final EIS
No Action Alternative
Preferred Alternative
Alternative 2
Alternative 3
I see that you included my comments in the summary.


9
Here is the Record of Decision. You'll need to follow these guidelines.
ROD

The NEPA Process



The Proposed Action



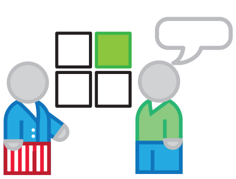
Frequently, private individuals or companies will become involved in the NEPA process when they need a permit issued by a federal agency. The agency itself may identify the need to take an action, or the agency may need to make a decision on a proposal brought to it by someone outside of the agency, such as an applicant for a permit. Based on the need, the agency develops a proposal for action.

When an entity, like the JCPA, applies for a permit (for example, for impacting waters of the United States), the agency that is being asked to issue the permit must first evaluate the environmental effects of the permit decision under NEPA. Federal agencies might require the entity to pay for the preparation of analyses, but the federal agency remains responsible for the scope and accuracy of the analysis.

Each year, thousands of documents, including Environmental Assessments (EAs) and Environmental Impact Statements (EISs), are prepared by federal agencies to make informed decisions about proposed actions. These documents provide citizens with an opportunity to learn about and participate in the decision-making process. It is important to understand that commenting on a proposed action is not a vote on whether it should take place. However, the information citizens provide during the NEPA process can influence the decision makers and their final decisions, because NEPA requires that federal decision makers be informed of the environmental consequences of their decisions.

The Draft EIS

We Are Here



When agencies submit a Draft EIS (DEIS) for public comment, the public has another opportunity to contribute valuable feedback. The Environmental Protection Agency (EPA) publishes a Notice of Availability in the Federal Register informing the public that the draft is available for comment, and the lead federal agency often publishes this notice in local newspapers.

The comment period is generally 45 days long; however, this may vary. During this time, the agency may conduct public meetings or hearings as a way to solicit public comments. The agency will also request comments from other federal, state, tribal, and local agencies that may have jurisdiction or interest in the proposed action.

The identification and evaluation of alternative ways to meet the proposed action's "purpose and need" is the heart of the NEPA analysis. The lead agency or agencies must evaluate all reasonable alternatives that will achieve the agency's objective.

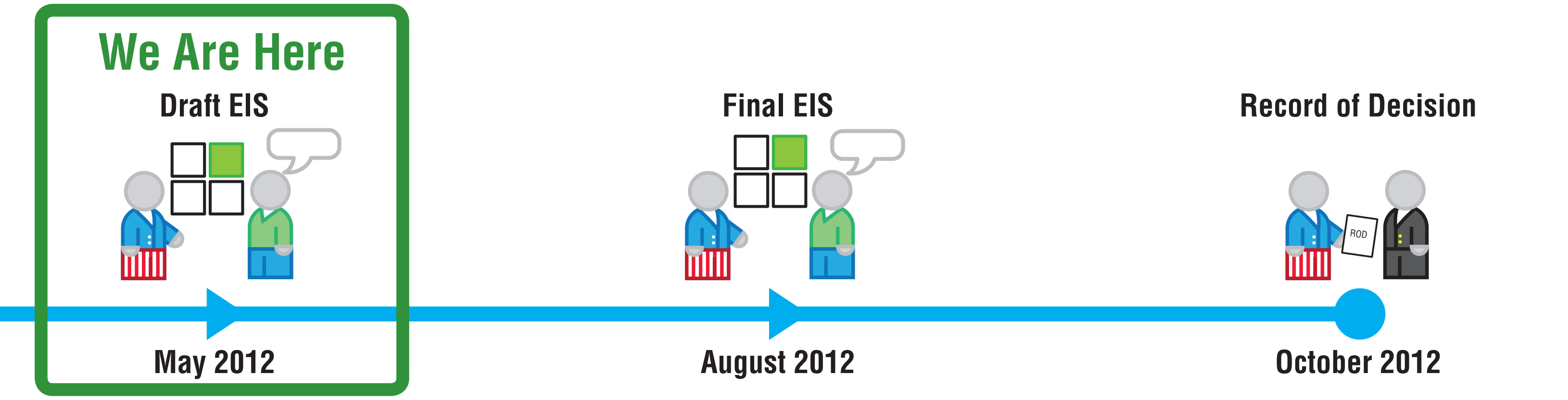
About Alternatives…

When analyzing alternatives for a proposed action, agencies must always describe and analyze a "no action alternative." The "no action alternative" is simply what would happen if the agency did not act upon the proposal for action.

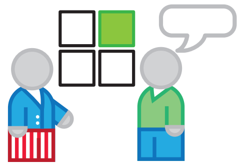
If an agency has a preferred alternative when it publishes a Draft EIS (DEIS), the draft must identify which alternative the agency prefers. All agencies must identify a preferred alternative in the Final EIS (FEIS), unless another law prohibits it from doing so.

The agency must analyze the full range of direct, indirect, and cumulative effects of the preferred alternative and of the reasonable alternatives identified in the DEIS. For purposes of NEPA, "effects" and "impacts" mean the same thing. They include ecological, aesthetic, historic, cultural, economic, social, or health impacts, whether adverse or beneficial. It is important to note that human beings are part of the environment (this is why Congress used the phrase "human environment" in NEPA), so when an EIS is prepared and economic or social and natural or physical environmental effects are interrelated, the EIS should discuss all of these effects.

To review the Draft EIS, visit: **www.PortofPascagoulaEIS.com**



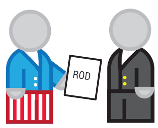
The Final EIS



When the public comment period is complete, the agency analyzes comments, conducts further analysis as necessary, and prepares the Final EIS (FEIS). In the FEIS, the agency must respond to the comments received from the public. The response can be in the form of changes in the FEIS, factual corrections, modifications to the analyses or the alternatives, new alternatives considered, or an explanation of why a comment does not require the agency's response.

A copy or a summary of public comments and the agency's responses to each comment will be included in the FEIS. When it is ready, the agency will publish the FEIS and the EPA will publish a Notice of Availability in the Federal Register. The Notice of Availability marks the start of a waiting period. A minimum of 30 days must pass before the agency can make a decision on their proposed action unless the agency couples the 30 days with a formal internal appeals process.

The Record of Decision



The Record of Decision (ROD) is the final step for agencies in the EIS process. The ROD is a document that states what the decision is; identifies the alternatives considered, including the environmentally preferred alternative; and discusses mitigation plans, including any enforcement and monitoring commitments.

The ROD will also discuss whether all practical means to avoid or minimize environmental harm have been adopted, and if not, why they were not. The ROD is a publicly available document. Sometimes RODs are published in the Federal Register or on the agency's website. If interested in receiving the ROD, citizens should ask the agency's point-of-contact how to obtain a copy of the ROD.

It is important to understand that commenting on a proposed action is not a vote on whether it should take place. However, the information citizens provide during the NEPA process can influence the decision makers and their final decisions.

Who is Involved?

The Jackson County Port Authority (the Applicant)

U.S. Army Corps of Engineers (the Lead Agency)

U.S. Coast Guard and National Marine Fisheries Service (Cooperating Agencies)

The Public and Local Stakeholders

Project Vicinity Map

Purpose and Need

The purpose of the proposed project is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the turning basin in Bayou Casotte. The current width of the channel imposes transit limitations for marine vessel traffic that delay vessels and fosters inefficient use of the channels and harbor.

The proposed project is intended to:

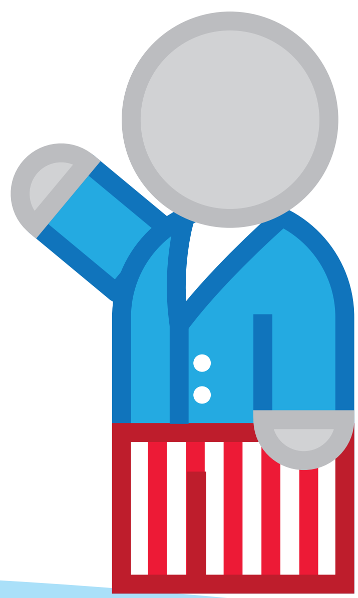
- Reconfigure the channel to alleviate the current transit restrictions and increase travel efficiencies for vessel transit
- Improve conditions for port operations
- Maintain or improve the current level of safety for vessel operations under the improved conditions

Specific benefits anticipated as a result of the proposed project are listed below:

- Transit during daylight and dark hours for crude oil tankers (in ballast) and Panamax bulk carriers
- Transit of liquefied natural gas tankers during higher wind and current conditions (than permittable by present conditions)
- Two-way traffic allowable under established conditions and criteria (as opposed to current one-way traffic restrictions)
- Improved terminal operations and increased production hours due to decreased number of delays

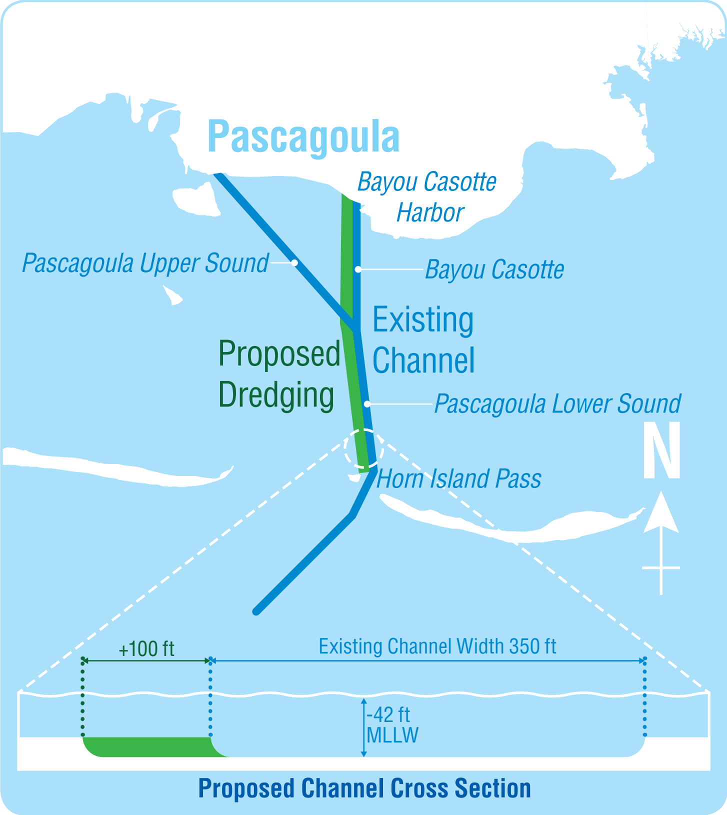
In addition to the NEPA-required purpose and need discussed above, the 404(b)(1) Guidelines require that the Corps define the "basic project purpose" and the "overall project purpose" to evaluate appropriate alternatives.

- **The basic purpose of the proposed project is to improve marine navigation.**
- **The overall purpose of the proposed project is to improve operating conditions and efficiency in the Pascagoula Lower Sound and Bayou Casotte channels and Bayou Casotte Harbor.**



Proposed Alternatives

Alternative 1: Applicant's Preferred Alternative – Widen the Existing Channel By 100 Feet on the West Side



Alternative 1, the Applicant's Preferred Alternative (Preferred Alternative), would include dredging approximately 38,200 feet (7.2 miles) of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segments to widen the channel 100 feet on the west side, parallel to the existing channel centerline, to the existing depth of –42 feet Mean Lower Low Water (MLLW), and the placement of the approximately 3.4 million cubic yards (mcy) of dredged material as beneficial use in the Ocean Dredged Material Disposal Site (ODMDS).

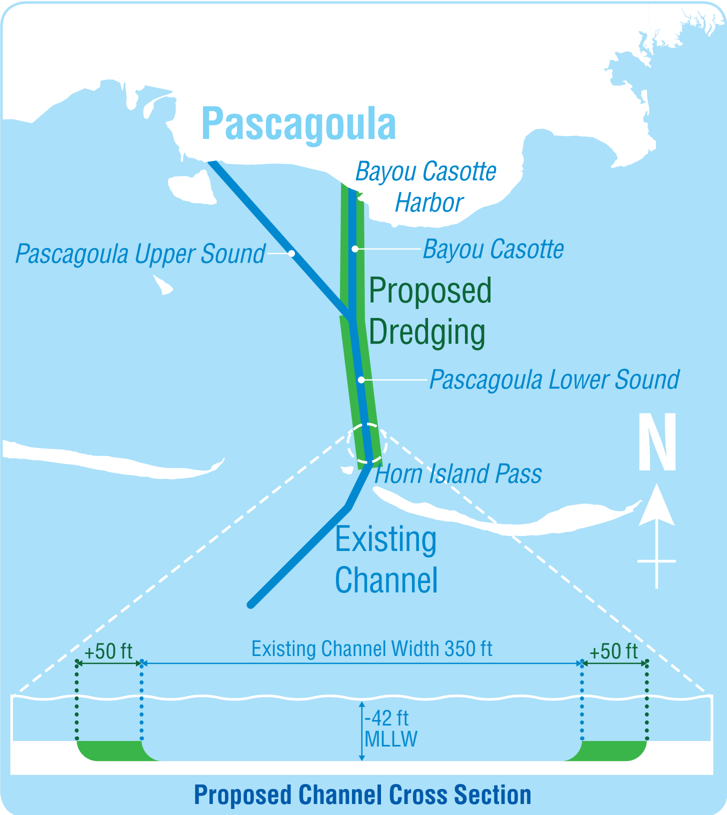
Under the Preferred Alternative, dredged material management would include beneficial use placement of approximately 3.7 percent (125,000 cy) of the dredged material in the designated Littoral Zone Area (LZA) located east and south of Horn Island, and placement of the remainder of the material (approximately 3.3 mcy) in the Pascagoula ODMDS south of Horn Island.

The predominant current is east to west, and the sand and fine sediments accumulate more quickly on the west side of the channel. Therefore, the volume of dredged material available for beneficial use under this alternative is limited due to the excavation of material from the west side of the channel.

This alternative meets the purpose and need for the project and would benefit existing facilities that use the channel and/or the port.

Alternative 1 was selected as the Preferred Alternative because it is more operationally efficient (e.g. eases turns) than the project would be under Alternative 2.

Alternative 2: Widen the Existing Channel By 50 Feet on Each Side



Alternative 2 would include dredging approximately 38,200 feet (7.2 miles) along the length of the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segments to widen the channel by 50 feet on each side, parallel to the existing channel centerline, to the existing depth of –42 feet MLLW, and the placement of approximately 3.3 mcy of associated dredged material as beneficial use in the ODMDS.

Under Alternative 2, dredged material management would include beneficial use placement of approximately 9.6 percent (315,000 cy) of the dredged material in the designated LZA and placement of the remainder of the material (approximately 3.0 mcy) in the Pascagoula ODMDS. The larger volume of material available for beneficial use under Alternative 2 is due to dredging along both sides of the channel. Sediments on the east side of the channel tend to have a greater sand content due to the east-west currents, and fine sediments tend to accumulate on the west side of the channel.

Dredging for the channel widening would be implemented by the JCPA. Dredging is anticipated to begin in late 2014 or early 2015.

Please Submit Comments by May 29, 2012 to:

U.S. Army Corps of Engineers, Mobile District
Regulatory Division
c/o Philip A. Hegji
PO Box 2288
Mobile, AL 36628-0001
Email: Philip.A.Hegji@usace.army.mil
Online: www.PortofPascagoulaEIS.com

Comments may be submitted by mail, email, or online.

To review the Draft EIS, visit:

www.PortofPascagoulaEIS.com

Attendee Card

Attendee Card

Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

Public Hearing, Thursday, May 10, 2012
Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel
Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES O NO POSITION ______________________________

Would you like to make an oral comment at tonight's hearing? O YES O NO

First and Last Name______________________________

Mailing Address______________________________

Physical Address______________________________

City, State, Zip Code______________________________

Email Address______________________________

Affiliation______________________________

How did you learn about this hearing? (Please check one)

O Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain)______________________________

How would you prefer to receive information about this project? (Please check one)

O Website O Mail O Email O Newspaper

O Other (Please explain)______________________________

Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

COMMENT FORM

Public Hearing
May 10, 2012
6:00 p.m. – 9:00 p.m.

ARE YOU A PUBLIC OFFICIAL? O YES O NO POSITION ____________________

First and Last Name	**How did you learn about this hearing?** O Newspaper Notice O Notice in Mail O Email O Website O Other (please explain) ____________________
Street Address	
City, State, Zip Code	
Email Address	
Affiliation	

COMMENTS: *(Please make additional comments on the back, if needed.)*

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This comment form may be turned in tonight, mailed, or emailed to the address below. Please submit your comments by May 29, 2012 to:

U.S. Army Corps of Engineers, Mobile District
Regulatory Division
c/o Philip A. Hegji
PO Box 2288
Mobile, AL 36628-0001
philip.a.hegji@usace.army.mil

U.S. Army Corps of Engineers, Mobile District
Regulatory Division
c/o Philip A. Hegji
PO Box 2288
Mobile, AL 36628-0001

U.S. Army Corps of Engineers, Mobile District
Regulatory Division
c/o Philip A. Hegji
PO Box 2288
Mobile, AL 36628-0001
philip.a.hegji@usace.army.mil

Appendix D: Attendee Information

Agency Workshop Attendee Database
Agency Workshop Sign In Sheet
Public Hearing Attendee Database
Completed Public Hearing Attendee Cards

Agency Workshop Attendee Database

First Name	Last Name	Agency/Affiliation	Address	City	ST	Zip	Phone	Email
Heather	Stratton	USCG	500 Poydras	New Orleans	LA	70130	504 671 2112	heather.e.stratton@uscg.mil
Joe	Tempio	USCG	500 Poydras	New Orleans	LA	70130	504 671 2110	joseph.m.tempio@uscg.mil
Kevin	Bloyd	USCG	S. Broad St.	Mobile	AL	36615	251 441 5684	kevin.m.bloyd@uscg.mil
Allen	Moeller	JCPA	3033 Pascagoula St., P.O. Box 70	Pascagoula	MS	39567	228 762 4041	amoeller@portofpascagoula.com
Damon	Young	USACE	109 St. Joseph St.	Mobile	AL	36608	251 694 3781	damon.m.young@usace.army.mil
Kim	Fitzgibbons	Atkins	7406 Fullerton St., Suite 350	Jacksonville	FL	77015	904 363 8441	kimberly.fitzgibbous@atkinsglobal.com
Angela	Bulger	Atkins	6504 Bridge Point Pkwy., Suite 200	Austin	TX		512 342 3388	angela.bulger@atkinsglobal.com
Mike	Smith	JCPA	P.O. Box 70	Pascagoula	MS	39566	228 762 4041	msmith@portofpascagoula.com
Philip	Hegji	USACE	109 St. Joseph St.	Mobile	AL	36608	251 690 3222	philip.a.hegji@usace.army.mil
Don	Mroczko	USACE	109 St. Joseph St.	Mobile	AL	36608	251 690 3185	donald.e.mroczko@usace.army.mil
Veronica	Beech	NMFS	3500 Delwood Beach Rd.	Panama City Beach	FL	32408	850 234 5061	veronica.beech@noaa.gov
Ron	Cole	MDMR	1141 Bayview Ave.	Biloxi	MS	39530	228 523 4117	ronald.cole@dmr.ms.gov
Pam	Latham	Atkins	4300 W. Boy Scout	Tampa	FL	33607	813 272 7275	pamela.latham@atkinsglobal.com
Carrie	Barefoot	MDEQ	515 E. Amite St.	Jackson	MS		601 961 5322	carrie_barefoot@deg.state.ms.us
Beth	Spalding	Atkins	1 Galleria Blvd., Suite 1516	Metairie	LA	70001	504 841 2226	elizabeth.spalding@atkinsglobal.com

US Army Corps of Engineers
Mobile District

Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

Thursday, May 10, 2012
2:00 P.M. – 4:00 P.M.
The Grand Magnolia Ballroom
3604 Magnolia Street
Pascagoula, Mississippi 39567

Agency Workshop Sign-In Sheet

Order	Name	Agency Affiliation	Address	Phone	Email
1	Heather Stratton	USCG	500 Poydras New Orleans LA 70130	504 671 2112	heather.e.stratton@uscg.mil
2	Joe Tempio	USCG	500 Poydras New Orleans, LA 70130	504 671 2110	joseph.m.tempio@uscg.mil
3	Kevin Bloyd	USCG	S. Broad St. Mobile, AL 36615	251-441-5684	kevin.m.bloyd@uscg.mil
4	Allen Moeller	JCPA	3033 Pascagoula St P.O. Box 70 Pascagoula, MS 39567	228-762-4041	amoeller@portofpascagoula.com
5	Damon "Skip" Young	USACE	109 St. Joseph St. Mobile, AL 36608	251-694-3781	damon.m.young@usace.army.mil
6	Kim Fitzgibbons	Atkins	7406 Fullerton St., Suite 350 Jacksonville, FL 32256	904-363-8447	kimberly.fitzgibbons@atkinsglobal.com
7	Angela Bulger	Atkins	6504 Bridge Point Pkwy, Ste 200 Austin, TX ~~785~~	512-342-3388	angela.bulger@atkinsglobal.com
8	Mike Smith	JCPA	P.O. Box 70 Pascagoula MS 39568	228-762-4041	msmith@portofpascagoula.com
9	Philip Hegji	USACE	109 St Joseph St Mobile, AL 36608	251-690-3222	philip.a.hegji@usace.army.mil
10	Don Mroczko	USACE	109 St. Joseph St Mobile, AL 36608	251/690-3185	donald.e.mroczko@usace.army.mil
11	Veronica Beech	NMFS	3500 Delwood Beach Rd. Panama City Beach FL 32408	850 2345061	veronica.beech@noaa.gov
12	Ron Cole	MDMR	1141 Bayview Ave. Biloxi, MS 39530	(228) 523-4117	ronald.cole@dmr.ms.gov

Page **1** of **4**

US Army Corps of Engineers® Mobile District

Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

Thursday, May 10, 2012
2:00 P.M. – 4:00 P.M.
The Grand Magnolia Ballroom
3604 Magnolia Street
Pascagoula, Mississippi 39567

Agency Workshop Sign-In Sheet

Order	Name	Agency Affiliation	Address	Phone	Email
13	Pam Latham	Atkins	Tampa 33607 ~~4~~5300 W Boy Scout	813 272 7275	Pamela.Latham@atkinsglobal.com
14	Carrie Barefoot	MDEQ	515 E. Amite St. Jackson, MS	601-961-5322	Carrie_Barefoot@deq.state.ms.us
15	Beth Spalding	Atkins	1 Galleria Blvd, Suite 1516 Metairie, LA 70001	504-841-2226	elizabeth.spalding@atkinsglobal.com
16					
17					
18					
19					
20					
21					
22					
23					

Page **2** of **4**

Public Hearing Attendee Database

First Name	Last Name	Public Official?	Position	Address	City	State	Zip	Mailing Address	Email Address	Affiliation	Learned about the meeting?	Preferred noticing method?
Blakeny	Firmin	No		3724 River Rd.	Moss Point	MS	39563		bfirmin@dwwattorneys.com		Email	Mail, Email, Newspaper
Doug	Quillen	No		600 Travis Suite 5701	Houston	TX	77002				Newspaper Notice	
Mary	Spalding	No		4202 Pascagoula St.	Pascagoula	MS	39567				Newspaper Notice	Newspaper
Angela	Curry	No		600 Travis Suite 5701	Houston	TX	77002				Newspaper Notice	Website
Ed	Cake	No		2510 Ridgewood Rd.	Ocean Springs	MS	39564		ed.cake@yahoo.com	Gulf Environmental Associates	Newspaper Notice	Email
Michael	Mangum	Yes	Supervisor Jackson County	1723 Kenneth Ave.	Pascagoula	MS	39568	P.O. Box 928	mike_mangum@co.jackson.ms.us		Mail Notice	Email
Shannon	Strunk	No		3001 Beach Blvd.	Pascagoula	MS	39567		shannon@babers.com			
Cynthia	Baber-Strunk	No		3001 Beach Blvd.	Pascagoula	MS	39567		cynthia@babers.com	Babers Inc.	Website	Email
Robert	Hardy	No		1015 Kell Eave.	Pascagoula	MS	39567		rmhtc@bellsouth.net		Email	Email
Jan	Hardy	No		1015 Kell Eave.	Pascagoula	MS	39567		rmhtc@bellsouth.net		Email	Email
Stephen	Guerry	No		2007 Woodmont St.	Pascagoula	MS	39567		captain12_2000@yahoo.com		Newspaper Notice	Newspaper
David	Munkler	No		704 Mill Rd.	Pascagoula	MS	39567				Newspaper Notice	Mail
Marcy	Estabrook	No		1207 Westwood St.	Pascagoula	MS	39567		betm@cableone.net		Newspaper Notice	Email
Jim	Estabrook			1207 Westwood St.	Pascagoula	MS	39567		estabrookjb@yahoo.com		Newspaper Notice	Email
Jolene	Williams	No		9712 Kaena Place	Diamondhead	MS	39525				Other - Friend	
Dannie	Arnold	No		1205 Jackson Ave.	Pascagoula	MS	39567		genearnold1@aol.com	Property Owner (Beach)	Newspaper Notice	Email
Doug	Hague	No		709 Columbus Dr.	Pascagoula	Ms	39567				Newspaper Notice	Mail, Newspaper
David	Johnston	No		23490 Benville Rd.	Picayune	MS	39466		djohnston@inland-dredging.com		Website	Email
Rose	Ominski	No		4204 Pascagoula St.	Pascagoula	MS	39567		rominski@comcast.net		Newspaper Notice	Email
John	Crane	No		24311 Lake Drive	Montrose	AL	36559	P.O. Box 53	john.f.crane.jr@usace.army.mil	COE		
Rhonda	Miller			3825 Ridgewood Rd.	Jackson	MS	39211		rhonda.miller@mbponline.org	Mississippi Public Broadcasting		

Completed Public Hearing Attendee Cards

Attendee Card

Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

Public Hearing, Thursday, May 10, 2012
Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel
Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES ● NO POSITION ____

Would you like to make an oral comment at tonight's hearing? O YES O NO

First and Last Name Blakeny Firmin

Mailing Address 3724 River Road

Physical Address ____

City, State, Zip Code Moss Point, MS 39563

Email Address bfirmin@dwwattorneys.com

Affiliation ____

How did you learn about this hearing? (Please check one)

O Newspaper Notice O Notice In Mail ● Email O Website

O Other (Please explain) ____

How would you prefer to receive information about this project? (Please check one)

O Website ● Mail ● Email ● Newspaper

O Other (Please explain) ____

Attendee Card

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Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES ✓ NO POSITION ____

Would you like to make an oral comment at tonight's hearing? O YES ✓ NO

First and Last Name DOUG QUILLEN

Mailing Address 600 TRAVIS Suit 5701

Physical Address ____

City, State, Zip Code Houston TX 77002

Email Address ____

Affiliation ____

How did you learn about this hearing? (Please check one)

✓ Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain) ____

How would you prefer to receive information about this project? (Please check one)

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O Other (Please explain) ____

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Jackson County, Mississippi

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Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES ☒ NO POSITION ____

Would you like to make an oral comment at tonight's hearing? O YES ☒ NO

First and Last Name MARY SPALDING

Mailing Address 4202 Pascagoula St

Physical Address ____

City, State, Zip Code 39567

Email Address ____

Affiliation ____

How did you learn about this hearing? (Please check one)

☒ Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain) ____

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Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES ☒ NO POSITION ____

Would you like to make an oral comment at tonight's hearing? O YES O NO

First and Last Name Angela Curry

Mailing Address 600 Travis St. Suite 5701

Physical Address ____

City, State, Zip Code Houston TX 77002

Email Address ____

Affiliation ____

How did you learn about this hearing? (Please check one)

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O Other (Please explain) ____

How would you prefer to receive information about this project? (Please check one)

☒ Website O Mail O Email O Newspaper

O Other (Please explain) ____

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Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES ☑ NO POSITION

Would you like to make an oral comment at tonight's hearing? ☑ YES O NO

First and Last Name Ed Cake

Mailing Address 2510 Ridgewood Road. Ocean Springs, MS 39564

Physical Address Same

City, State, Zip Code Ocean Springs, Ms 39564

Email Address ed.cake@yahoo.com

Affiliation Gulf Environmental Associates

How did you learn about this hearing? (Please check one)

☑ Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain)

How would you prefer to receive information about this project? (Please check one)

O Website O Mail ☑ Email O Newspaper

O Other (Please explain)

Attendee Card

Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

Public Hearing, Thursday, May 10, 2012
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Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? ☒ YES O NO POSITION SUPERVISOR JACKSON COUNTY

Would you like to make an oral comment at tonight's hearing? O YES ☒ NO

First and Last Name MICHAEL W MANGUM

Mailing Address PO BOX 928

Physical Address 1723 KENNETH AV

City, State, Zip Code PASCAGOULA, MS 39568

Email Address MIKE_MANGUM@CO.JACKSON.MS.US

Affiliation

How did you learn about this hearing? (Please check one)

O Newspaper Notice ☒ Notice In Mail O Email O Website

O Other (Please explain)

How would you prefer to receive information about this project? (Please check one)

O Website O Mail ☒ Email O Newspaper

O Other (Please explain)

Attendee Card

Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

Public Hearing, Thursday, May 10, 2012
Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel
Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES X NO POSITION ________

Would you like to make an oral comment at tonight's hearing? O YES O NO

First and Last Name SHANNON STRUNK

Mailing Address 3001 BEACH BLVD

Physical Address ________

City, State, Zip Code PASCAGOULA MS 39567

Email Address SHANNON @ BABERS.COM

Affiliation ________

How did you learn about this hearing? (Please check one)

O Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain) ________

How would you prefer to receive information about this project? (Please check one)

O Website O Mail O Email O Newspaper

O Other (Please explain) ________

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Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

Public Hearing, Thursday, May 10, 2012
Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel
Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES ~~O NO~~ POSITION ________

Would you like to make an oral comment at tonight's hearing? O YES O NO

First and Last Name Cynthia Baber-Strunk

Mailing Address 3001 Beach Blvd.

Physical Address Same

City, State, Zip Code Pascagoula, MS 39567

Email Address cynthia@babers.com

Affiliation Babers Inc

How did you learn about this hearing? (Please check one)

O Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain) Pascagoula Web site

How would you prefer to receive information about this project? (Please check one)

O Website O Mail ~~O Email~~ O Newspaper

O Other (Please explain) ________

Attendee Card

Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

Public Hearing, Thursday, May 10, 2012
Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel
Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES ☑ NO POSITION ___

Would you like to make an oral comment at tonight's hearing? ☑ YES O NO

First and Last Name Robert & Jan Hardy

Mailing Address 1015 Kell Ave

Physical Address ___

City, State, Zip Code Pascagoula, Ms 39567

Email Address rmhtc@BellSouth.net

Affiliation ___

How did you learn about this hearing? (Please check one)

O Newspaper Notice O Notice In Mail ☑ Email O Website

O Other (Please explain) ___

How would you prefer to receive information about this project? (Please check one)

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Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES ☑ NO POSITION ___

Would you like to make an oral comment at tonight's hearing? O YES ☒ NO

First and Last Name Stephen Guidry

Mailing Address 2007 Woodmont St.

Physical Address ~~BA~~

City, State, Zip Code Pascagoula, Ms. 39567

Email Address Captain2 2000 @ yahoo.com

Affiliation NA

How did you learn about this hearing? (Please check one)

☑ Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain) ___

How would you prefer to receive information about this project? (Please check one)

O Website O Mail O Email ☒ Newspaper

O Other (Please explain) ___

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Jackson County, Mississippi

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Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES ✓ NO POSITION ______

Would you like to make an oral comment at tonight's hearing? O YES O NO

First and Last Name David Munkler

Mailing Address 704 Mull Rd Pascagoula MS 39567

Physical Address same

City, State, Zip Code Pascagoula MS 39567

Email Address ______

Affiliation ______

How did you learn about this hearing? (Please check one)

✓ Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain) ______

How would you prefer to receive information about this project? (Please check one)

O Website ✓ Mail O Email O Newspaper

O Other (Please explain) ______

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Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES ✓ NO POSITION ______

Would you like to make an oral comment at tonight's hearing? O YES ✓ NO

First and Last Name Marcy Estabrook

Mailing Address 1207 Westwood St.

Physical Address " "

City, State, Zip Code Pascagoula, MS 39567

Email Address betm@cableone.net

Affiliation ______

How did you learn about this hearing? (Please check one)

✓ Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain) ______

How would you prefer to receive information about this project? (Please check one)

O Website O Mail ✓ Email O Newspaper

O Other (Please explain) ______

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ARE YOU AN ELECTED OFFICIAL? O YES O NO POSITION

Would you like to make an oral comment at tonight's hearing? O YES O NO

First and Last Name Jim Estabrook

Mailing Address 1207 Westwood Rd.

Physical Address Same as above

City, State, Zip Code Pascagoula, Ms. 39567

Email Address estabrook.jb@yahoo.com

Affiliation

How did you learn about this hearing? (Please check one)

✓ Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain)

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ARE YOU AN ELECTED OFFICIAL? O YES X NO POSITION

Would you like to make an oral comment at tonight's hearing? O YES O NO

First and Last Name Jolene Williams

Mailing Address 9712 Kaena Place Dr

Physical Address

City, State, Zip Code Diamondhead MS 39525

Email Address

Affiliation

How did you learn about this hearing? (Please check one)

O Newspaper Notice O Notice In Mail O Email O Website

✓ Other (Please explain) friend

How would you prefer to receive information about this project? (Please check one)

O Website O Mail O Email O Newspaper

O Other (Please explain)

Attendee Card

Draft Environmental Impact Statement for the Proposed Widening of the
Pascagoula Lower Sound/Bayou Casotte Channel
Jackson County, Mississippi

Public Hearing, Thursday, May 10, 2012
Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel
Grand Magnolia Ballroom, 3604 Magnolia Street, Pascagoula, MS 39567

ARE YOU AN ELECTED OFFICIAL? O YES X NO POSITION NO

Would you like to make an oral comment at tonight's hearing? O YES X NO

First and Last Name DANNIE E ARNOLD

Mailing Address 1205 JACKSON AVE

Physical Address

City, State, Zip Code PASCAGOULA, MS

Email Address geneARNOLD1@AOL.COM

Affiliation PROPERTY OWNER (BEACH)

How did you learn about this hearing? (Please check one)

X Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain)

How would you prefer to receive information about this project? (Please check one)

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ARE YOU AN ELECTED OFFICIAL? O YES ✓ NO POSITION

Would you like to make an oral comment at tonight's hearing? O YES ✓ NO

First and Last Name DOUG HAGUE

Mailing Address 709 Columbus Dr

Physical Address SAME

City, State, Zip Code PASCAGOULA, MS

Email Address

Affiliation

How did you learn about this hearing? (Please check one)

✓ Newspaper Notice O Notice In Mail O Email O Website

O Other (Please explain)

How would you prefer to receive information about this project? (Please check one)

O Website ✓ Mail O Email ✓ Newspaper

O Other (Please explain)

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ARE YOU AN ELECTED OFFICIAL? O YES ~~O~~ NO POSITION

Would you like to make an oral comment at tonight's hearing? O YES X NO

First and Last Name DAVID Johnston

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Email Address djohnston@inland-dredging.com

Affiliation

How did you learn about this hearing? (Please check one)

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ARE YOU AN ELECTED OFFICIAL? O YES X NO POSITION

Would you like to make an oral comment at tonight's hearing? X YES O NO

First and Last Name Rose Ominski

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Affiliation

How did you learn about this hearing? (Please check one)

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ARE YOU AN ELECTED OFFICIAL? O YES ● NO POSITION _____

Would you like to make an oral comment at tonight's hearing? O YES O NO

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Email Address john.f.crane.jr@usace.army.mil

Affiliation COE

How did you learn about this hearing? (Please check one)

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O Other (Please explain)_____

How would you prefer to receive information about this project? (Please check one)

O Website O Mail O Email O Newspaper

O Other (Please explain)_____

Rhonda J. Miller
Gulf Coast Reporter 90.3 FM

p 228-385-8777
c 769-798-8821
rhonda.miller@mpbonline.org

MPB Mississippi Public Broadcasting

3825 Ridgewood Road | Jackson, Mississippi 39211 | www.mpbonline.org

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Draft Environmental Impact Statement for the Proposed Widening of the
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Jackson County, Mississippi

und/Bayou Casotte Channel
, Pascagoula, MS 39567

POSITION _____

ght's hearing? O YES O NO

First and Last Name Rhonda J. Miller

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City, State, Zip Code Jackson, MS 39211

Email Address rhonda.miller@mpbonline.org

Affiliation Mississippi Public Broadcasting

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O Other (Please explain)_____

Appendix E: Meeting Documentation

Agency Workshop Photographs

Public Hearing Photographs

Public Hearing Transcript

Agency Workshop Photographs

Upon arrival, attendees were asked to sign in at the registration table.

Agency representatives were provided with an agenda and a project newsletter at the beginning of the agency workshop.

Agency representatives were invited to attend an informal, round-table discussion on May 10, 2012.

A total of 15 attendees were present at the agency workshop.

Agency representatives were provided with an opportunity to express their concerns and inform the Corps of items to be addressed in the final version of the EIS.

Agency representatives were able to speak directly to project representatives and ask additional questions after the workshop.

Public Hearing Photographs

Upon arrival at the May 10, 2012 public hearing, attendees were invited to complete an attendee card at the registration table.

Attendees received a project newsletter that describes the proposed project's purpose and details.

After registration, attendees were invited to view displays around the room to learn about the proposed project.

Project representatives from the Corps and the JCPA were available throughout the open house to speak one-on-one with attendees and answer questions.

The public was invited to an informal open house style meeting from 6:00 p.m. to 7:00 p.m. and a formal public hearing from 7:00 p.m. to 9:00 p.m.

At 7:00 p.m., Corps Mobile District Commanding Officer, Steven Roemhildt, opened the meeting and explained the Corps' ground rules for the public hearing.

JCPA Deputy Port Director, Allen Moeller, gave a short presentation about the proposed project.

Members of the public were allowed ten minutes to provide their oral comments.

All oral comments were documented by a court reporter, and an official transcript is available in Appendix E.

Baskets were placed throughout the meeting to collect completed comment forms.

Public Hearing Transcript

PUBLIC HEARING

FOR THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR THE PROPOSED WIDENING OF THE

PASCAGOULA LOWER SOUND/BAYOU CASOTTE CHANNEL

JACKSON COUNTY, MISSISSIPPI

****

MAGNOLIA GRAND BALLROOM

PASCAGOULA, MISSISSIPPI

MAY 10, 2012

7:00 P.M.

APPEARANCES:

U.S. ARMY CORPS OF ENGINEERS (Mobile District)

Colonel Steven Roemhildt
Phillip Hegji
Cindy House-Pearson
Damon Young
Lisa Coaghlan

JACKSON COUNTY PORT AUTHORITY

Allen Moeller

ATKINS

Kim Fitzgibbons
Pamela Latham
Angela Bulger
Elizabeth Spalding

CESI

Leslie Pompa
Laura Sanchez
Greg Sevcik
Kay Crouch
Maggie Fitzgerald

(7:00 p.m.)

PROCEEDINGS

COLONEL ROEMHILDT: Good evening, everybody. I think it's seven o'clock, so I'd like to call this meeting to order.

We're here today for the Bayou Casotte Harbor Improvement Project. And I apologize if there was some confusion. I understand there was maybe some misleading information in the paper today. But this is clearly the Bayou Casotte Harbor Improvement Project permit process there, where we are opening a public hearing to solicit public comment as part of our environmental impact studies out there on this particular project there.

My name is Colonel Steve Roemhildt. And I'm the Commander of the Mobile District U.S. Army Corps of Engineers. And I have the best job in the Army. I command a great team of engineers and scientists. And I live and work over in Mobile. And, however, this part of the Mississippi Coastline falls underneath our jurisdiction there.

The Army Corps of Engineers is a Federal agency, and a large Army military command that's three basic commissions there. One is civil works. And you're probably familiar with that with, you know, our Mississippi Coastal Improvement Program. We also operate a lot of locks and dams and some hydropower plants.

We also do military construction for the U.S. Army and the U.S. Air Force. And our third mission there is of a regulatory nature there. And that's kind of why we're there today is part of our regulatory mission where, you know, the Corps of Engineers takes seriously our mission in terms of protecting the Nation's aquatic resources while allowing fair and responsible development through flexible, balanced, and transparent permitting processes.

And today what we're going to do is through the -- as part of the National Environmental Protection Act, and as part of the Environmental Impact Statements that we're having, we're conducting a public hearing. And we wanted to solicit public comment into that permit decision coming up.

Before we actually begin the process, I would like to acknowledge our elected officials. And Mike Magnum, who's the County Supervisor for the Jackson County Board of Supervisors. Thank you, sir.

A little bit about the course of the operations, the procedures here tonight. What we're going to do is, I think we have two people that have signed up for statements. And I guess I want to emphasize statements. We're not here to really address the statements or answer questions. We're actually here to take public statements that will be a part of the record that will incorporate it into the Environmental Impact Statement there.

So what I'd ask you to do, if you haven't signed up already, I'd like to have you, there's some comment cards, there's some sign-up cards in the back and, just, if you want to make a public record, please sign up for that.

However also, if you don't want to make public comments, if you just want to make comments, written comments, we'll take those, as well. We'll do that by E-mail. However, I want to emphasize that 29 May is the last day for receipt of those comments.

Now, tonight what I'd like to do is, when you do come up, it will be -- I think we only have about ten -- I'm sorry. We have about two people that are signed up. So what we'll probably do is just, I'd like to have limit your comments to ten minutes. And from there, then we'll get that part of the public record.

Tonight what I will start off with is Allen Moeller, who is the applicant from the Port Authority, is going to give us a little presentation on the actual permit, the application, and then we will allow the public statements to take place.

And then before I hand it over to Allen, Damon, if you want to kind of talk about through some administrative procedures we're going to have tonight.

And I also want to emphasize, even though we are not taking -- you know, it's not going to be questions and answers here during the public hearing, my team, consisting of Phillip Hegji, Cindy House-Pearson, my Chief of Regulatory, and Phillip's the project manager, we will remain here as long as we need to address questions about the EIS statement, about the EIS, about the NEPA process there. So we'll address questions one on one after the hearing.

So with that, Skip, if you could lead us off.

DAMON YOUNG: Actually, sir, you nailed it. So at this point in time, Colonel, I believe we are ready for Allen. Allen, if you would like come on up and give your presentation, sir.

ALLEN MOELLER: Thank you, Colonel. Good evening, everyone. Again, I'd like to welcome everyone and thank you for coming out tonight. My name is Allen Moeller, and I'm the Deputy Port Director for the Port of Pascagoula Operations and

Facilities.

And we appreciate your interest in this project, and to learn about the project, and to participate in this public hearing. We started this project about three and a half years ago. And this is, really, a major milestone for us to have the draft Environmental Impact Statement out available to you all and available for comment.

There's been a lot of information put out tonight. We've got the displays, as you can see, so I don't really want to get too much into the specifics, specifics of the project. We have that information available on the boards.

But the general scope of it is widen the channel, the entrance channel, from Horn Island Pass, the south end of Horn Island Pass, up to Bayou Casotte by 100 feet. It's currently 350 feet wide, and this project would increase that width to 450 feet. It would not increase the depth of the channel.

The disposal of the material, it

would go the two areas south of Horn Island Pass. One will be a Littoral Zone, where a small amount of material would go. The other disposal area would be the ocean disposal site, where the vast majority of the material would be disposed of.

But I would like to take a couple of minutes to talk about the importance of this project for the Port of Pascagoula and for Jackson County and the community. Pascagoula has a long maritime history, and the prosperity has been tied to the accessibility of the Port and Worldwide shipping lanes. It's this accessibility which attracted major industries to build their facilities here over the years.

We have Ingalls Shipbuilding. We have Signal International, Chevron, U.S.A., VT Halter Marine, Mississippi Phosphates, and most recently Gulf LNG completed their terminal. And all of these industries rely on that deepwater channel and having access to the facilities.

It's also this accessibility which

allows us to host events, like the upcoming commissioning of the USS Mississippi. It's the Navy's newest fast attack submarine, which will be commissioned here at the Port on June 2nd.

And as ships grow larger over the years, the Port has seen the need to increase the size of the channel to accommodate these larger ships and the offshore drill rigs. Prior to this permit application, the most recent authorization for channel improvements was in 1986. That was under the 1986 Water Resources Development Act. And that project was broken up into several different segments, and we'll be constructing the last part of it that we expect to construct sometime next year. And that will be the entrance channel. We open to get that going in 2013.

Something else that happened over the years is there's been an increased focus on safety. And this came about in large part by a heightened awareness after the Exxon Valdez incident in 1989. We now have more stringent rules for ships, based on ship size, time of day, environmental factors, such as wind and current. Many vessels now take two pilots instead of one pilot. Baseline experience, four pilot apprentices. That's changed. It's become much more stringent.

Greater depths are maintained under the keel, between the keel and the bottom of the channel. Again, providing an additional safety margin. A couple of years ago, we had a data buoy system installed, which provided realtime wind and current information to mariners. So all these things were done to improve safety.

We've got some of the most modern tug boats in the Gulf available to assist ships to and from the docks. So the channel widening improvements which are the subject of tonight's hearing are really about increasing the availability of the channel to these vessels. It will reduce congestion, improve the operating efficiency of the channel, while maintaining or improving the safety of moving those vessels.

Once constructed, the improved channel will provide the current ship traffic better access to the Port and will provide additional capacity for future growth of the Port.

And we'd like to thank Colonel Roemhildt, and the Corps of Engineers for all their work and coordination that's got us to this stage in the process. Thank you for coming this evening. And we look forward to receiving your comments. Thank you.

COLONEL ROEMHILDT: We're going to move the podium here slightly, and just momentarily we'll take the public comments.

DAMON YOUNG: All right. Ladies and gentlemen, we will begin taking comments. I believe at this time we have three who have expressed interest in speaking. Again, 10 minutes per person, and then we will have someone monitoring your time, so we will let you know as you get close.

But, again, just limit it to about 10 minutes. At this time, our first speaker Mr. Ed Cake, sir.

ED CAKE: Good evening. I am Dr. Ed Cake, Chief Science officer of Gulf Environmental Associates, which is a public and private environmental firm headquartered in Ocean Springs, Mississippi. I wish to submit my comments tonight for the record, and have already given a copy, but I think she's taking it verbatim, also.

I have four points to make, and it will be brief. Recent channel dredging projects in Gulfport, Mississippi, and in Orange Beach, Alabama, that you may all be aware of by now, have encountered submerged mats of BP oil with very problematic results, including but not limited to re-oiling beaches and wetlands, increase in tar ball accumulation on public beaches and fouling of sandy shorelines.

Number 2, I am concerned with the submerged pools and pockets of BP's oil that will be encountered during the proposed widening of the Bayou Casotte Pascagoula Channel.

My question is, how will those contaminated spoils be handled, and ultimately where will they be disposed of. Will those oil foul sediments be cored and tested prior to dredging and disposal? Has the Corps sought the aide and cooperation of BP to assist with this potential problem and to compensate the Corps and the U.S. taxpayers for the added financial burden caused by the submerged oil deposits?

Has any thought been given to rebuilding of the Grand Batour Islands. Point number 3, at the mouth of Point Aux Chenes Bay just east of Bayou Casotte, with clean sediments from the widening channel. That bay and its former oyster resources could be improved by the re-creation of that submerged coastal barrier. That site is closer by about two-thirds than the offshore disposal sites that are proposed in your EIS.

I have provided to the Department of Marine Resources, and other entities, a proposal for reestablishing oyster production in that Bay. And it called for the reestablishment of the Grand Batour Islands, which is a beneficial use, and I think would be a lot cheaper, because they're a lot closer.

Point number four, I strongly recommend that this channel widening project be delayed until BP's inshore deposits of submerged oil are located and dealt with. BP conducted coastal side scan sonar surveys from West Florida to Central Louisiana. I spoke with the subcontractors that did that. They know the locations of those oil pools and pockets. Just ask them. Thank you.

COLONEL ROEMHILDT: Thank you.

DAMON YOUNG: All right. We have number two on the list, Mr. Robert Hardy. Sir.

ROBERT HARDY: Good evening. My name is Robert Hardy, and I'm a lifelong citizen of Pascagoula, Mississippi. I hate to be constrained to ten minutes, since this is going to be one of the World's shortest meetings, apparently, but maybe you'll indulge me if I have to run over a couple of minutes.

Ross Barnett, that famous Governor of ours in the '50s, said if you can't trust a trustee, who can you trust? I'm a retired Navy Commander, and I come from the school that says, if it looks like a duck and waddles, it's a duck.

So I'm not going to ask a direct question, but I'm going to ask a rhetorical question. Five months ago we had a permit request that the DMR tried to sneak in that was on behalf of the Corps of Engineers to provide for dredging the mouth of Bayou Casotte some distance out in the channel. And on top of that, the Corps of Engineers' permit asked for ten years authorization to bring ten years of dredge spoils from ports and harbors and channels throughout the Gulf of Mexico. And there was a huge uprising against that train wreck, and it was shelfed by

Dr. Walker, DMR head.

I'm assuming that the permit requirements for that particular permit for the Corps still exists. Where are they going to put dredge spoils for the next ten years? And on this document that I got today from you guys, it shows a large area south of Horn Island.

There are two spoil areas. One on the eastern of Horn and then one that runs almost the entire length of Horn Island. Never seen that before. And the gentleman who spoke just a moment ago representing the Port Authority said that spoil area has been out there for a long time. And I'd like to know rhetorically, are you going to be pumping dredge spoils, contaminated or whatever, from harbors up and down the Gulf, south of Horn Island.

If you can't trust a trustee, who can you trust. I'm going to put this in perspective with a little historical recap, very briefly. About four years ago, Governor Barbour, with a vested interest in his consulting firm in

Washington, and by the they represent the Petrochemical industry pipelines, offshore tankers, et cetera, hardly endorsed the Richton salt dome project.

If you recall, they were going to core out the Richton Salt dome and put about an 80-mile pipeline through the heart of the Pascagoula River Basin, take it out one mile south of Horn Island and over a five-year period they were going to pump 95 billion gallons of concentrated brine that was 1.4 times saltier than the ambient saltwater, along with two million gallons of toxic chemicals to facilitate the pipeline. And in that salt would be heavy metals, radioactive materials, et cetera.

And a huge uproar occurred, and that was shelved by the Department of Energy under the strategic petroleum reserve folks. Spend money, spend money, spend money.

This may be a new opportunity. But as a lay person, I want to raise a question. We have the LNG Terminal, which

I was surprised to here tonight is not mothballed. It is supposed to come online in about two to three weeks, and then the price of national gas will determine whether or not that facility is used in the short term. And that's a 1.7 billion dollar boondoggle by the Department of Energy. Same guys that funded the Cylindrium Corporation.

Well, if you're bringing in two super tankers a week, carrying 95 billion cubic feet of natural gas liquified under pressure, do you think that the STA, the strategic -- the guys that check you at the airport. Homeland Security. Is Homeland Security and the Coast Guard going to allow two way traffic in this channel with two super tankers a week coming in, and each tanker is carrying 95 billion gallons of liquified natural gas.

People wanted to put an investment and build a Port in Los Angeles, and they shut it down. Because they said if a ship crushed the hull of one of those super tankers and the liquid natural gas escaped, it expands by a rate of 800 times and in a very short period of time, there will be a vapor of -- a gas vapor cloud over Los Angeles, that if it detonated it would be 20 times the explosive power of the bom that took out Hiroshima.

But they voted it down and said, no. Our folks said yes, and it's here and it's soon to come online. So my question to the Corps is, by increasing the width of the channel 100 feet, 50 feet on either side if you go center line, is that going to give you enough wiggle room to allow an LNG tanker to come in while Bubba is coming out heading for South America to pick up another load of oar or whatever. I don't think so.

So my question rhetorically is, what's really going on? I asked some specific questions to the gentleman from the Port Authority. He was very candid and he said, this project is being funded to the tune of $40 million by private industry. $40 million. Wonderful. Great. My question is, how is that going to alleviate the risk reward factor if two tankers a week are coming in here carrying 95 million cubic feet of natural gas and if Bubba is texting at the wheel instead of watching what he's supposed to be doing, could there be a collision at sea? It's happened before.

Or could we have Ahab the Arab dressed up as a shrimper come down the channel with a load of C5 and take out the side of the LNG terminal. I can't believe that our collective wisdom and leadership would be so naive as to not be addressing that issue. And if they're not, somebody in a position of authority should be raising a red flag right now say, Whoa.

Do we really have arms around the potential risk? Because if one of those tankers ever did light off, it would vaporize half of Pascagoula. And I mean vaporize it. It happened in Tripoli. It happened up in Cleveland, Ohio in the 1940s.

So who do you trust? Who do you trust? DEQ, our esteemed friends in

Jackson. They're mandate by the State Legislature is to protect human life. They have never turned down a permit yet in Pascagoula. And every year our local industry, God bless them, they're an economic engine and they make a lot of payments, a lot of payroll and a lot a taxes, but each year, by permit, they discharge 4.7 million pounds of listed toxic chemicals and carcinogens. 4.7 million pounds a year.

And yet the DEQ is to protect human health. The fact that Jackson County is in the top ten percent of American counties, 3,171 counties, we're in the top ten percent with the highest cancer incidents and cancer death rate in America. Every day and a half somebody dies of cancer in Jackson County. Is it just unfortunate luck or that's the way it goes, that's the way the cookie crumbles. I don't know.

But here's another state agency, DEQ supposed to protect human life and they authorize 4.7 million pounds of carcinogens and toxicants to be discharged in the air and water.

This past year, Chevron received an additional permit to release another 800 tons on top of their 1.2 million pounds a year.

So, working in good faith, yes. Good friends, good associates, all. But if it looks like a duck and waddles, odds are it's a duck. And my rhetorical question is, what happened to that 10-year requirement for 12-5 million cubic yards of additional dredge spoils? Interesting that that just went away.

DAMON YOUNG: Thank you, sir. All right. We will call our third speaker, Ms. Rose Ominski, I believe.

ROSE OMINSKI: I'm a resident of Pascagoula. I've been in construction for a number of years. I want to ask the panel when you dredge, when you dredge that amount of soil, who's going to do reinforcing with bulkheads to prevent land from caving in?

Right now, you have a natural flow of

water through the channel and everything seems to be settled. So if you go and dredge deeper and wider, what's going to prevent the silt and the soil and everything else from coming down, which is going to intrude on property owners, it's going to intrude on the industry of Bayou Casotte.

And according to the map which we have seen, it doesn't show any dredging above the, how would you say, the shoreline. So what are you going to do actually in Bayou Casotte? Are you going to go up above the shoreline inland or are you just going to dredge to the shoreline. If you dredge just to the shoreline, how are you going to help Chevron? How are you going to help LNG? How are you going to help VT Halter? How are you going to help all these other industries that depend on that channel? Because that's not indicated on your map. That's not indicated in your projected dredging project.

So how are you really going to help

the community here at large? How are you going to bring additional ships, larger ships, larger vessels? How are you going to do that? Because you have not, according to the information that I received tonight, you have not provided that information. The dredging just goes up to the shoreline and stops. So how is the community going to benefit from your dredging? Thank you.

DAMON YOUNG: Thank you, ma'am. At this time, do we have anyone else who would like to come up and speak?

Okay. We will be available shortly here after to mingle around. If anyone has any questions, by all means, pull one of the us aside. And at this time, I'll turn it over to Commander.

COLONEL ROEMHILDT: Yes. Thank you very much. I appreciate everybody's comments. This will be part of the public record. And I'd like to also emphasize, if you heard something here today that sparked some interest, if you'd like to make some further comments or whatever, please, there's some information back here for the E-mails. You can do it, send it in. We will accept comments up until 29 May.

And before I close this, though, I just want to remind you, our team will be readily available afterwards to address any specific questions you may have about this project or about the Corps of Engineers, in general.

ED CAKE: Including 29 May.

COLONEL ROEMHILDT: Including 29 May. Good catch. Thank you. Including 29 May for that. Any general questions before I close this? Yes, sir.

ROBERT HARDY: Let's label it unintended consequences.

COLONEL ROEMHILDT: I apologize. What was the question, sir?

ROBERT HARDY: Unintended consequences. About 60 years ago, the Corps jumped on the Mississippi River to try to alleviate flooding, et cetera, change river directions and all that, but that compounded with the gas and oil exploration efforts in South Louisiana have basically destroyed what was a natural buffer zone. And now we know that there's so many thousands of feet a day of the marsh lands are being disanticipated.

What are unintended consequences for putting a huge amount of sediment out beyond Horn Island? Who's really looking at this? It looks like the left hand doesn't know what the right hand is doing. And as long as big bucks or big business is involved, it's winky, winky, and suddenly the EPA and the environmental people and save the gopher frogs or whatever suddenly is a moot point.

Have anybody looked at potential downstream consequences of putting huge quantities of silt and mud, and God knows what else, just south of Horn Island? Particularly if you guys do come in and put a 10-year pipeline out there and pile mud on top of mud.

COLONEL ROEMHILDT: Yes, sir. I understand. I think we got that. Excellent. Thank you, sir.

Okay. With that, what I'd like to do is close the meeting and be available for personal comments at your leisure. Thank you very much. And please drive safe on the way home tonight.

* * *

(Public Comments conclude at 7:27 p.m.)

* * *

C E R T I F I C A T E

STATE OF MISSISSIPPI

COUNTY OF HARRISON

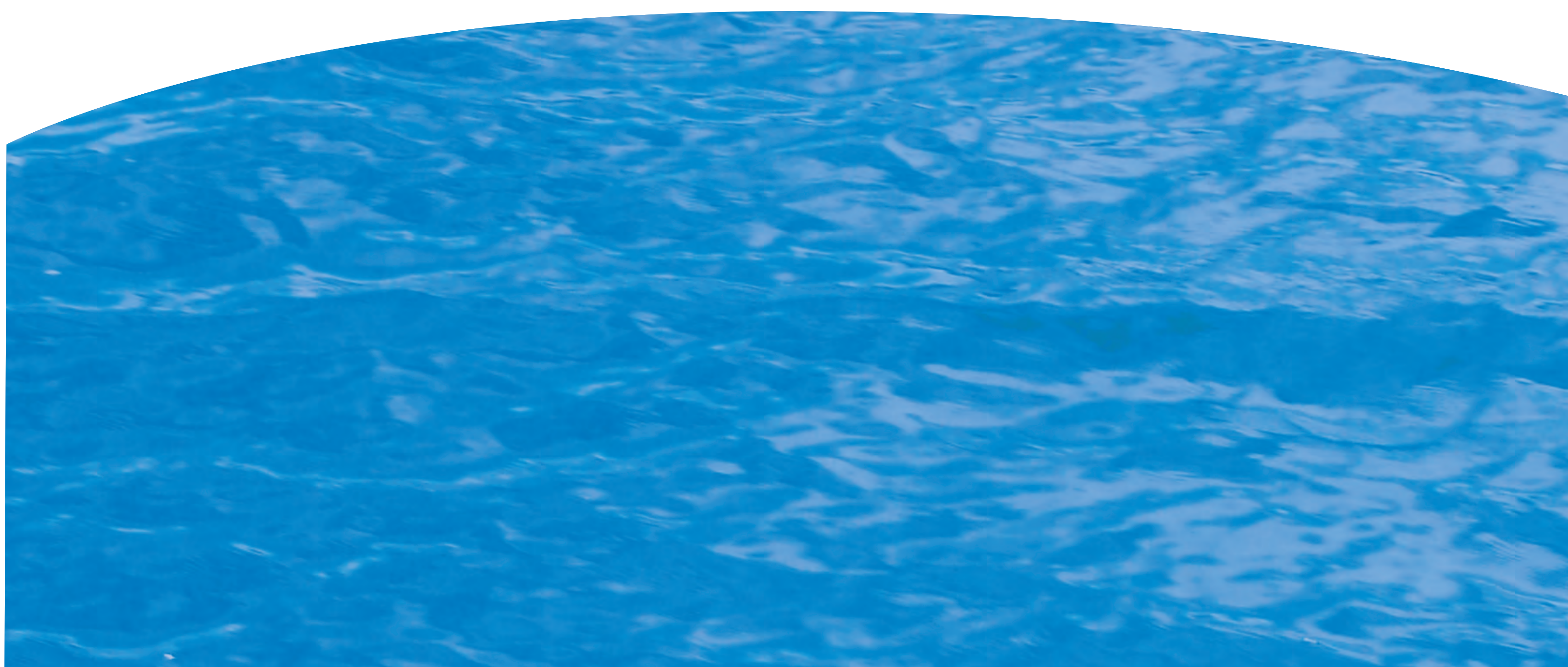
I, Pamela Michele Keenlance, CSR and Notary Public, duly commissioned for the County of Harrison, State of Mississippi, do hereby certify:

That on the 10th day of May, 2012, there was held before me the foregoing hearing, and that the preceding twenty-eight (28) pages contain a full, true, and correct copy of my stenotype notes, later reduced to typewritten form by computer-aided transcription, of said Proceedings;

That I am not related to or in anywise associated with any of the parties to this cause of action, or their counsel, and that I am not financially interested in the same;

IN WITNESS WHEREOF, I have hereunto set my hand, this the 24th day of May, 2012.

PAMELA MICHELE KEENLANCE, CSR #1511
My Commission Expires: 08-27-14



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US Army Corps of Engineers®
Mobile District

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Appendix I

Comments and Responses on Draft EIS

Comment No.	Name	Comment Source	Commenter Type	Organization	Address	Telephone	Email	Category	Comment	Response
1A	E.W. "Ed" Cake, Jr. Ph.D.	Public Hearing Comment Card / Verbal Comment	Business	Gulf Environmental Associates	2510 Ridgewood Rd., Ocean Springs, MS 39564	228/324-9292	ed.cake@ yahoo. com	Hazardous, Toxic, and Radioactive Waste	Recent channel dredging projects in Gulfport, Mississippi, and Orange Beach, Alabama, have encountered submerged mats of BP's oil with very problematic results, including, but not limited to, re-oiling of beaches and wetlands, increases in tar-ball accumulations on public beaches, and fouling of sandy shorelines. Attachments to statement: Press-Register articles of 8 and 10 May regarding the Orange Beach, AL, dredging project that encountered BP's submerged oil deposits.	Data being collected by BP regarding locations of submerged oil is not publicly available at this time. As discussed in Section 3.10 and Appendix B of the EIS, EA Engineering, Science, and Technology, Inc. conducted sediment characterization sampling in the project area in early April 2010 prior to the Deepwater Horizon oil rig explosion and spill. Sediment characterization sampling was again conducted in late-November to early-December 2012. Comparison of the two data sets was conducted to determine if sediment quality had been affected by the Deepwater Horizon oil spill. According to EA 2011b "Based on results of PAH and total petroleum hydrocarbon (TPH) testing of surface sediments collected in the Bayou Casotte and Pascagoula Lower Sound Channels, two EPA-designated reference sites, and the Pascagoula ODMDS in November and December 2010, there were no discernable changes noted in the sediment quality that could be attributed to the Deepwater Horizon Oil Spill." In addition, sediments in the study area were tested for PAHs and no contamination was documented following the Deepwater Horizon oil spill, (Section 4.13.1.2). As discussed in Section 6.0, If warranted, the Applicant will supplement the analysis of dredged sediments for the presence of contaminants prior to placement. If present, contaminated sediments will be mitigated via measures determined through coordination with EPA. Additionally, if submerged oil is encountered during dredging, the U.S. Coast Guard will be notified immediately.
1B	E.W. "Ed" Cake, Jr. Ph.D. (cont.)	Public Hearing Comment Card / Verbal Comment	Business	Gulf Environmental Associates	2510 Ridgewood Rd., Ocean Springs, MS 39564	228/324-9292	ed.cake@ yahoo. com	Hazardous, Toxic, and Radioactive Waste	I am concerned with the submerged pools and pockets of BP's oil that will be encountered during the proposed widening of the Bayou Casotte-Pascagoula Channel. How will those contaminated spoils be handled and ultimately where will they be disposed of? Will those oil-fouled sediments be cored and tested prior to dredging and disposal? Has the Corps sought the aid and cooperation of BP to assist with this potential problem and to compensate the Corps and US taxpayers for the added financial burden caused by the submerged oil deposits?	Data being collected by BP regarding locations of submerged oil is not publicly available at this time. As discussed in Section 3.10 and Appendix B of the EIS, EA Engineering, Science, and Technology, Inc. conducted sediment characterization sampling in the project area in early April 2010 prior to the Deepwater Horizon oil rig explosion and spill. Sediment characterization sampling was again conducted in late-November to early-December 2012. Comparison of the two data sets was conducted to determine if sediment quality had been affected by the Deepwater Horizon oil spill. According to EA 2011b "Based on results of PAH and total petroleum hydrocarbon (TPH) testing of surface sediments collected in the Bayou Casotte and Pascagoula Lower Sound Channels, two EPA-designated reference sites, and the Pascagoula ODMDS in November and December 2010, there were no discernable changes noted in the sediment quality that could be attributed to the Deepwater Horizon Oil Spill." In addition, sediments in the study area were tested for PAHs and no contamination was documented following the Deepwater Horizon oil spill, (Section 4.13.1.2). As discussed in Section 6.0, If warranted, the Applicant will supplement the analysis of dredged sediments for the presence of contaminants prior to placement. If present, contaminated sediments will be mitigated via measures determined through coordination with EPA. Additionally, if submerged oil is encountered during dredging, the U.S. Coast Guard will be notified immediately.
1C	E.W. "Ed" Cake, Jr. Ph.D. (cont.)	Public Hearing Comment Card / Verbal Comment	Business	Gulf Environmental Associates	2510 Ridgewood Rd., Ocean Springs, MS 39564	228/324-9292	ed.cake@ yahoo. com	Project Alternatives	Has any thought been given to rebuilding of the Grand Batture Islands at the mouth of Point aux Chenes Bay just east of Bayou Casotte with clean sediments from the widened channel? That bay and its former oyster resources could be improved by the recreation of that submerged coastal barrier.	Per MS Department of Marine Resources (who manages the Beneficial Use program for the State of MS), management of the Grand Bay National Estuarine Research Reserve in which the Grand Batture Islands are located has firmly stated that they are not interested in being part of the beneficial use program.

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1D	E.W. □Ed□ Cake, Jr. Ph.D. (cont.)	Public Hearing Comment Card / Verbal Comment	Business	Gulf Environmental Associates	2510 Ridgewood Rd., Ocean Springs, MS 39564	228/324-9292	ed.cake□ yahoo. com	Proposed Project	I strongly recommend that this channel-widening project be delayed until BP's inshore deposits of submerged oil are located and dealt with. BP conducted coastal side-scan sonar surveys from west Florida to central Louisiana. They know the locations of those oil pools and pockets. Just ask them.	Data being collected by BP regarding locations of submerged oil is not publicly available at this time. As discussed in Section 3.10 and Appendix B of the EIS, EA Engineering, Science, and Technology, Inc. conducted sediment characterization sampling in the project area in early April 2010 prior to the Deepwater Horizon oil rig explosion and spill. Sediment characterization sampling was again conducted in late-November to early-December 2012. Comparison of the two data sets was conducted to determine if sediment quality had been affected by the Deepwater Horizon oil spill. According to EA 2011b "Based on results of PAH and total petroleum hydrocarbon (TPH) testing of surface sediments collected in the Bayou Casotte and Pascagoula Lower Sound Channels, two EPA-designated reference sites, and the Pascagoula ODMDS in November and December 2010, there were no discernable changes noted in the sediment quality that could be attributed to the Deepwater Horizon Oil Spill.□In addition, sediments in the study area were tested for PAHs and no contamination was documented following the Deepwater Horizon oil spill, (Section 4.13.1.2). As discussed in Section 6.0, If warranted, the Applicant will supplement the analysis of dredged sediments for the presence of contaminants prior to placement. If present, contaminated sediments will be mitigated via measures determined through coordination with EPA. Additionally, if submerged oil is encountered during dredging, the U.S. Coast Guard will be notified immediately.
2	Steven Guerry	Public Hearing Comment Card	Private Citizen		2007 Woodmont St., Pascagoula, MS 39567		captain12□2000 □ yahoo.com	Proposed Project	I would like to see the dredging spoils pumped over onto Round Island in an on going effort to stop the erosion of the island. The island has suffered fires, yearly erosion from storms and is slowly disappearing. The dredge mud and spoils should be pumped into the center of the Isle in order to elevate the land. Pip rap (broken up concrete) should be placed around the island where boaters won't be landing. This would help to stabilize the islands shore. All future dredge spoils should be used to build up the island.	Dredged material placement alternatives considered are discussed in Section 2.3.2 of the EIS. Dredged material placement options, including Round Island, were eliminated from further consideration due to lack of approval/permitting, lack of sufficient available capacity, or differing sediment characteristics (i.e., not sandy) that preclude placement. If a beneficial use site becomes available for use prior to construction, it will be considered for placement of suitable material.

Comment No.	Name	Comment Source	Commenter Type	Organization	Address	Telephone	Email	Category	Comment	Response
3	Robert Hardy	Public Hearing Verbal Comment	Private Citizen					Proposed Project	Good evening. My name is Robert Hardy, and I'm a lifelong citizen of Pascagoula, Mississippi. I hate to be constrained to ten minutes, since this is going to be one of the World's shortest meetings, apparently, but maybe you'll indulge me if I have to run over a couple of minutes. Ross Barnett, that famous Governor of ours in the '50s, said if you can't trust a trustee, who can you trust? I'm a retired Navy Commander, and I come from the school that says, if it looks like a duck and waddles, it's a duck. So I'm not going to ask a direct question, but I'm going to ask a rhetorical question. Five months ago we had a permit request that the DMR tried to sneak in that was on behalf of the Corps of Engineers to provide for dredging the mouth of Bayou Casotte some distance out in the channel. And on top of that, the Corps of Engineers' permit asked for ten years authorization to bring ten years of dredge spoils from ports and harbors and channels throughout the Gulf of Mexico. And there was a huge uprising against that train wreck, and it was shelved by Dr. Walker, DMR head. I'm assuming that the permit requirements for that particular permit for the Corps still exists. Where are they going to put dredge spoils for the next ten years? And on this document that I got today from you guys, it shows a large area south of Horn Island. There are two spoil areas. One on the eastern of Horn and then one that runs almost the entire length of Horn Island. Never seen that before. And the gentleman who spoke just a moment ago representing the Port Authority said that spoil area has been out there for a long time. And I'd like to know rhetorically, are you going to be pumping dredge spoils, contaminated or whatever, from harbors up and down the Gulf, south of Horn Island. If you can't trust a trustee, who can you trust. I'm going to put this in perspective with a little historical recap, very briefly. About four years ago, Governor Barbour, with a vested interest in his consulting firm in Washington, and by the they represent the Petrochemical industry pipelines, offshore tankers, et cetera, hardly endorsed the Richton salt dome project. If you recall, they were going to core out the Richton Salt dome and put about an 80-mile pipeline through the heart of the Pascagoula River Basin, take it out one mile south of Horn Island and over a five-year period they were going to pump 95 billion gallons of concentrated brine that was 1.4 times saltier than the ambient saltwater, along with two million gallons of toxic chemicals to facilitate the pipeline. And in that salt would be heavy metals, radioactive materials, etcetera. And a huge uproar occurred, and that was shelved by the Department of Energy under the strategic petroleum reserve folks. Spend money, spend money, spend money. This may be a new opportunity. But as a lay person, I want to raise aquestion. We have the LNG Terminal, which I was surprised to here tonight is not mothballed. It is supposed to come online in about two to three weeks, and then the price of national gas will determine whether or not that facility is used inthe short term.	This EIS addresses only dredge material from the proposed channel widening of Pascagoula Lower Sound/Bayou Casotte Channel. It does not include bringing in dredge material from other projects or ports across the Gulf of Mexico. Additionally, dredged material from this project will be adequately tested to insure that contaminants are not transported from the channel to the disposal sites. As denoted in EPA Comment Letter May 29, 2012, this EIS adequately addresses the potential environmental impacts of the proposed project (EPA rating of EC-1).Please also refer to Section 1.5 for a description of the Scope of the Document and Environmental Analysis. As discussed in Section 1.4, Purpose and Need, the purpose of the proposed project is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the turning basin in Bayou Casotte, alleviate current vessel transit restrictions, and increase travel efficiencies for vessel transit. The current width of the channel imposes transit limitations for marine vessel traffic that delays vessels and fosters inefficient use of the channels and harbor. Vessel simulations indicate that widening the channel by 100 ft will be sufficient to accommodate intended vessel traffic at the Port. No additional LNG ship calls are anticipated as a result of the proposed project and, therefore, no additional risk related to additional vessels is anticipated. Security at the port and in US navigable waters are the responsibility of the port, Homeland Security and the US Coast Guard. These agencies are aware of the risks to our nation's coastline and have plans in place in the event of an emergency or terrorist attempt.Please also refer to Section 1.5 for a description of the Scope of the Document and Environmental Analysis.

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3	Robert Hardy (cont.)	Public Hearing Verbal Comment	Private Citizen					Proposed Project	And that's a 1.7 billion dollar boondoggle by the Department of Energy. Same guys that funded the Cylindrium Corporation. Well, if you're bringing in two super tankers a week, carrying 95 billion cubic feet of natural gas liquefied under pressure, do you think that the STA, the strategic -- the guys that check you at the airport. Homeland Security. Is Homeland Security and the Coast Guard going to allow two way traffic in this channel with two super tankers a week coming in, and each tanker is carrying 95 billion gallons of liquefied natural gas. People wanted to put an investment and build a Port in Los Angeles, and they shut it down. Because they said if a ship crushed the hull of one of those super tankers and the liquid natural gas escaped, it expands by a rate of 800 times and in a very short period of time, there will be a vapor of -- a gas vapor cloud over Los Angeles, that if it detonated it would be 20 times the explosive power of the bomb that took out Hiroshima.But they voted it down and said, no. Our folks said yes, and it's here and it's soon to come online. So my question to the Corps is, by increasing the width of the channel 100 feet, 50 feet on either side if you go center line, is that going to give you enough wiggle room to allow an LNG tanker to come in while Bubba is coming out heading for South America to pick up another load of oar or whatever. I don't think so. So my question rhetorically is, what's really going on? I asked some specific questions to the gentleman from the Port Authority. He was very candid and he said, this project is being fundedto the tune of $40 million by private industry. $40 million. Wonderful. Great. My question is, how is that going to alleviate the risk reward factor if two tankers a week are coming in here carrying 95 million cubic feet of natural gas and if Bubba is texting at the wheel instead of watching what he's supposed to be doing, could there be a collision at sea? It's happened before. Or could we have Ahab the Arab dressed up as a shrimper come down thechannel with a load of C5 and take out the side of the LNG terminal. I can't believe that our collective wisdom and leadership would be so naive as to not be addressing that issue. And if they're not, somebody in a position of authority should be raising a red flag right now say, Whoa. Do we really have arms around the potential risk? Because if one of those tankers ever did light off, it would vaporize half of Pascagoula. And I mean vaporize it. It happened in Tripoli. It happened up in Cleveland, Ohio in the 1940s. So who do you trust? Who do you trust? DEQ, our esteemed friends in Jackson. They're mandate by the State Legislature is to protect human life. They have never turned down a permit yet in Pascagoula. And every year our local industry, God bless them, they're an economic engine and they make a lot of payments, a lot of payroll and a lot a taxes, but each year, by permit, they discharge 4.7 million pounds of listed toxic chemicals and carcinogens. 4.7 million pounds a year. And yet the DEQ is to protect human health. The fact that Jackson County is in the top ten percent of American counties, 3,171 counties, we're in the top ten percent with the highest cancer incidents and cancer death rate in America. Every day and a half somebodydies of cancer in Jackson County. Is it just unfortunate luck or that's the way it goes, that's the way the cookie crumbles. I don't know. But here's another state agency, DEQ supposed to protect human life and they authorize 4.7 million pounds of carcinogens and toxicants to be discharged in the air and water. This past year, Chevron received an additional permit to release another 800 tons on top of their 1.2 million pounds a year. So, working in good faith, yes. Good friends, good associates, all. But if it looks like a duck and waddles, odds are it's a duck. And my rhetorical question is, what happened to that 10-year requirement for 12.5 million cubic yards of additional dredge spoils? Interesting that that just went away.	This EIS addresses only dredge material from the proposed channel widening of Pascagoula Lower Sound/Bayou Casotte Channel. It does not include bringing in dredge material from other projects or ports across the Gulf of Mexico. Additionally, dredge material from this project will be adequately tested to insure that contaminants are not transported from the channel to the disposal sites. As denoted in EPA Comment Letter May 29, 2012, this EIS adequately addresses the potential environmental impacts of the proposed project (EPA rating of EC-1). Please also refer to Section 1.5 for a description of the Scope of the Document and Environmental Analysis. As discussed in Section 1.4, Purpose and Need, the purpose of the proposed project is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the turning basin in Bayou Casotte, alleviate current vessel transit restrictions, and increase travel efficiencies for vessel transit. The current width of the channel imposes transit limitations for marine vessel traffic that delays vessels and fosters inefficient use of the channels and harbor. Vessel simulations indicate that widening the channel by 100 ft will be sufficient to accommodate intended vessel traffic at the Port. No additional LNG ship calls are anticipated as a result of the proposed project and, therefore, no additional risk related to additional vessels is anticipated. Security at the port and in U.S. navigable waters are the responsibility of the port, Homeland Security and the U.S. Coast Guard. These agencies are aware of the risks to our nation's coastline and have plans in place in the event of an emergency or terrorist attempt.Please also refer to Section 1.5 for a description of the Scope of the Document and Environmental Analysis.

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4	Rose Ominski	Public Hearing Verbal Comment	Private Citizen					Proposed Project	I'm a resident of Pascagoula. I've been in construction for a number of years. I want to ask the panel when you dredge, when you dredge that amount of soil, who's going to do reinforcing with bulkheads to prevent land from caving in? Right now, you have a natural flow of water through the channel and everything seems to be settled. So if you go and dredge deeper and wider, what's going to prevent the silt and the soil and everything else from coming down, which is going to intrude on property owners, it's going to intrude on the industry of Bayou Casotte. And according to the map which we have seen, it doesn't show any dredging above the, how would you say, the shoreline. So what are you going to do actually in Bayou Casotte? Are you going to go up above the shoreline inland or are you just going to dredge to the shoreline. If you dredge just to the shoreline, how are you going to help Chevron? How are you going to help LNG? How are you going to help VT Halter? How are you going to help all these other industries that depend on that channel? Because that's not indicated on your map. That's not indicated in your projected dredging project. So how are you really going to help the community here at large? How are you going to bring additional ships, larger ships, larger vessels? How are you going to do that? Because you have not, according to the information that I received tonight, you have not provided that information. The dredging just goes up to the shoreline and stops. So how is the community going to benefit from your dredging? Thank you.	Under the proposed project, the existing Pascagoula Lower Sound/Bayou Casotte Federal Channel segment of Pascagoula Harbor would be widened by 100 feet and excavated as necessary to a depth consistent with the existing channel, and the northern portion of the Horn Island Pass Channel would be widened as necessary to facilitate (ease) the transition between the two channel segments. Figures 1.7-1 and 2.4-1 show the project area (dredging footprint) and proposed channel widening alternatives, respectively; the northern extent of the proposed dredging is the Bayou Casotte Harbor South Turning Basin. The proposed channel widening does not extend to shore or northward into Bayou Casotte Harbor. As such, no shoreline will be affected and no bulkheads needed. As discussed in Section 1.4, Purpose and Need, the purpose of the proposed project is to widen the Pascagoula Lower Sound and Bayou Casotte navigation channels from Horn Island Pass to the turning basin in Bayou Casotte, alleviate current vessel transit restrictions, and increase travel efficiencies for vessel transit. The current width of the channel imposes transit limitations for marine vessel traffic that delays vessels and fosters inefficient use of the channels and harbor. The proposed project is intended to: reconfigure the channel to alleviate the current transit restrictions and increase travel efficiencies for vessel transit; improve conditions for Port operations; and maintain or improve the current level of safety for vessel operations under the improved conditions. The proposed project is needed to reduce present transit restrictions along Pascagoula Lower Sound and Bayou Casotte navigation channel. The existing federally authorized channel dimensions restrict deep-draft vessels to one-way traffic, restrict vessels greater than 700 feet length overall (LOA) or draft greater than 36 feet to daylight travel, and impose restrictions on travel due to wind and current conditions. Current users of the Port of Pascagoula will benefit from operational efficiencies gained from the channel widening.
5A	Blakeny Firmin	Letter	Private Citizen		3724 River Rd., Moss Point, MS 39563	228/219-4721	bfirmin@dwattorneys.com	Proposed Project	I am writing as a concerned citizen of the city of Pascagoula. We found out yesterday of the Proposed Mud Lumps to be located on the south side of Horn Island. The barrier islands should not be exposed to anything dredged out of Bayou Casotte Harbor. Bayou Casotte is known for its oil, trash, and sludge in their waters. Its absolutely horrible for the environment, and frankly, I am surprised that this is even still being considered. What about Greenwood island or out near Chevron, or near Halter? There should be more data and requirements that go into decisions that would affect the entire city and the environment. Please don't let the money of a big corporation influence you to make a bad decision that will forever affect our waters and environment. Halter Marine should be forced to build a "dumping area" on their private property since its for the benefit of Halter. Please do not allow our city to suffer by allowing "mud lumps" near our barrier islands, or near our waters. Please make the right decision for the environment and for our future.	"Mud Lumps" are not germane to this project. Under the proposed project, the existing Pascagoula Lower Sound and Bayou Casotte navigation channels, from Horn Island Pass to the Bayou Casotte turning basin, will be widened by 100 feet (from 350 feet to 450 feet). The proposed project will increase port efficiency, although no additional LNG ship calls are anticipated as a result of the proposed project and, therefore, no additional risk related to additional vessels is anticipated. Suitable dredged material will be placed for beneficial use in the Littoral Zone Area (LZA), and the remainder of dredged material will be placed in the Pascagoula ODMDS. Dredging will not occur in Bayou Casotte Harbor, the northern extent of dredging is the Bayou Casotte South turning basin, on the west side of the entrance to Bayou Casotte Harbor.
5B	Blakeny Firmin (cont.)	Letter	Private Citizen		3724 River Rd., Moss Point, MS 39563	228/219-4721	bfirmin@dwattorneys.com	Proposed Project	We should have also been made aware of the hearing weeks ago. Just like last time, this meeting was a surprise to the tax paying citizens.	Please refer to Appendix H. The public hearing for the Draft EIS for the Proposed Widening of the Pascagoula Lower Sound/Bayou Casotte Channel was advertised in the Mississippi Press (Pascagoula, Mississippi) on April 4, 2012 and April 25, 2012 as well as in the Sun Herald (Gulfport, Mississippi) on April 8, 2012 and April 25, 2012.
6A	Gregory Hogue	Letter	Federal Government	U.S. Department of the Interior Office of Environmental Policy and Compliance	75 Spring St., S.W., Atlanta, Georgia 30303	404/331-4524	joyce_stanley@ios.doi.gov	Proposed Project	General Comments: Specifically, the project proposes to widen the channel on the west side of the existing channel centerline, with the most southern portion of the project boundary being contiguous with Gulf Islands National Seashore (GUIS) jurisdictional boundaries. Of appreciable interest to GUIS is the proposed deposition of approximately 125,000 cubic yards of dredged material in the Littoral Zone Area (LZA) located east and south of Horn Island within the boundaries of GUIS.	The Jackson County Port Authority (JCPA) is coordinating with the NPS and is applying for a Special Use Permit with NPS/GUIS. Language in the EIS and Appendix B of the EIS (Dredge Material Management) have been revised to include the necessary approvals/permits for use.

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6B	Gregory Hogue (cont.)	Letter	Federal Government	U.S. Department of the Interior Office of Environmental Policy and Compliance	75 Spring St., S.W., Atlanta, Georgia 30303	404/331-4524	joyce_stanley@ios.doi.gov	Proposed Project	Authorization of activities within NPS GUIS boundaries. Prior to dredging occurring within GUIS boundaries, the USACE must obtain a Special Use Permit issued by NPS, as substantiated by a Department of the Interior Regional Solicitor's opinion dated January 18, 2002, as paraphrased below: The Property Clause of the United States Constitution grants to Congress the authority to "make all needful rules and regulations respecting the territory or other property belonging to the United States." U.S. Const. art. IV, § 3, cl. 2. In the exercise of this authority, Congress commonly legislates upon the public lands in a general way and delegates to the Executive branch of government the authority to make specific regulations pertaining to those lands. *United States v. Cassiagnol*, 420 F.2d 868 (4 superscript 111 Cir.), cert. denied 397 U.S. 1044 (1970). Your question raises the fundamental question of which agency-COE [sic USACE] or the National Park Service-has been delegated authority to permit and regulate dredging and disposal operations within Oregon Inlet (a waterway contained with the jurisdictional boundaries of an NPS unit area-Cape Hatteras National Seashore). Congress authorized the COE to dredge a navigation channel at Oregon Inlet as a part of the Manteo Project. Section 101 of the Rivers and Harbors Act of 1970, P.L. 91-611, 84 Stat. 1818. From time to time since 1970, Congress has appropriated additional sums for maintenance dredging of this channel and disposal of dredged material. None of these legislative enactments contains explicit language which either excuses or subjects the COE to the regulatory power of the National Park Service with respect to these dredging and disposal activities. Congress has not explicitly excused COE's dredging and disposal activities from the Park Service's obligation to protect park resources from impairment. Thus, in order to give effect to all pertinent provisions of law enacted by Congress, COE may conduct its dredging and disposal activities within Cape Hatteras National Seashore only after it has obtained a Park Service permit. The permit, as all other permits issued by the Park Service, should impose reasonable conditions on the activity for the purposes of preserving park resources from impairment. Counter imposed against the expression of Congress' authorization of dredge and disposal activities within the National Seashore is the equally enforceable requirement that the Park Service not take actions which would impair protected resources. 16 U.S.C. § 1. In order to accommodate these countervailing interests, the permit may allow the activity to proceed subject to such terms and conditions necessary to protect park resources or public safety. 36 CFR 1.6(e). Thus, in our view, a permit is the most appropriate and convenient vehicle to carry out both congressionally authorized dredging and disposal activities and protection of park resources.	The Jackson County Port Authority (JCPA) is coordinating with the NPS and is applying for a Special Use Permit with NPS/GUIS. Language in the EIS and Appendix B of the EIS (Dredge Material Management) have been revised to include the necessary approvals/permits for use.
6C	Gregory Hogue (cont.)	Letter	Federal Government	U.S. Department of the Interior Office of Environmental Policy and Compliance	75 Spring St., S.W., Atlanta, Georgia 30303	404/331-4524	joyce_stanley@ios.doi.gov	Proposed Project	Disposal in Existing ODMDS Disposal Areas-It is imperative that all suitable island sediments be retained within the natural transport system and not disposed of in offshore areas. Placed correctly, these sediments will continually provide a sand source for the barrier islands. Disposal of island sediments offshore is detrimental to a system already in a sand-deficit situation. Removal of sediment from the littoral system only continues the interruption of the natural sand source and results in receding beaches and reductions in island width and elevation. Sediment disposal must make use of the most effective placement in order to provide maximum benefit to adjacent areas. For spoil material of suitable quality, there should be no offshore disposal.	As stated in Section 2.2.3 Dredged Material Management, material selected for beneficial use (including placement in beneficial use or other sites) must meet criteria established by the EPA in Title 40 C.F.R., Parts 220–228, for the chemical and physical characteristics of the sediments. As discussed in Section 2.4, the proposed alternatives consist of disposal of suitable material for beneficial use in the Littoral Zone Area (LZA). Disposal in the LZA would increase the amount of sediment (particularly sand) transported along the coast at an angle to the shoreline (also known as littoral drift), thereby helping to restore the sands deposited to the barrier islands via littoral currents. Material not suitable for beneficial use will be disposed of in the EPA-designated Pascagoula Ocean Dredged Material Disposal Site (ODMDS).

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6D	Gregory Hogue (cont.)	Letter	Federal Government	U.S. Department of the Interior Office of Environmental Policy and Compliance	75 Spring St., S.W., Atlanta, Georgia 30303	404/331-4524	joyce_stanley@ios.doi.gov	Proposed Project	Beneficial Use-Beach Nourishment. Placement of beach quality sediments on Spoil (Sand) Island within Disposal Area 10 is appropriate but must be accomplished outside of visitor use and shorebird nesting seasons. Large numbers of shorebirds utilize Spoil Island for nesting throughout the spring and summer. Large numbers of visitors utilize the island for recreation throughout the spring, summer, and fall. In order to avoid substantial disturbances to nesting sea turtles, nesting shorebirds, and other wildlife, and to minimize project affects on the visiting public, construction activities within the Bar Channel and placement of materials on Spoil Island should be limited to the months of November through February.	The Jackson County Port Authority (JCPA) is coordinating with the NPS and is applying for a Special Use Permit with NPS/GUIS. The permit application will include appropriate language/provisions to protect shorebirds. In addition, the current dredge placement alternatives do not include placement of material on Spoil Island. Appropriate dredged material (sandy sediments) will be placed in the LZA in shallow nearshore waters (–14 feet to –22 feet MLLW). In addition, the proposed project will not impose noise and/or visual disturbances to shorebirds beyond that routine maintenance dredging by the USACE-Mobile District. Maintenance dredging occurs every 42 to 72 months as necessary to maintain the channel between Petit Bois and Horn Island. Marine and coastal birds have been exposed to the noise and other effects of dredging and may have become habituated to the process.
6E	Gregory Hogue (cont.)	Letter	Federal Government	U.S. Department of the Interior Office of Environmental Policy and Compliance	75 Spring St., S.W., Atlanta, Georgia 30303	404/331-4524	joyce_stanley@ios.doi.gov	Fish and Wildlife	Marine and Coastal BirdsGiven the substantial use of the western and eastern most tips of the barrier islands, including Spoil Island (also known at the DA-10 disposal area) by nesting shorebirds, including several rare/sensitive species, potential disruption of the nesting process must be considered and avoided. Disturbance to nesting shorebirds, from both noise and visual impact, can result in continual and periodic flushing of the parent birds whereas the eggs and/or chicks are left exposed to predators and heat fatality. Continued disturbance can lead to the complete abandonment of a nest or colony, even after eggs are deposited in the nest. Disruption to nesting birds on the western end of Petit Bois Island and Spoil Island during nearby dredging activities is highly possible. This disruption, given the large numbers of shorebirds nesting on the islands, could be substantial. Whereas disruption to roosting birds might well allow return to normal following completion of dredging, the impact to the nesting process, specifically the possible mortality of eggs and chicks, occurs during the disturbance and cannot return to normal. In addition, continual or periodic flushing of the parent birds requires a significant amount of energy expenditure that the birds need to put towards egg production and chick rearing. It is unknown just how much the loss of this energy affects nesting success.In addition, nesting birds, once the nesting process has begun (i.e., egg deposition, incubation, and early chick rearing), are absolutely dependent upon that site and cannot relocate. Continued disturbance, leading to the abandonment of a nest or an entire colony, cannot be considered temporary and negligible. If the disturbance level is of sufficient magnitude to result in the abandonment of the entire colony, the reproductive loss of the colony would be significant and unacceptable. In order to avoid substantial disturbances to nesting shorebirds, construction activities within the Bar Channel and placement of materials on Spoil Island should be limited to the months of November through February.	The Jackson County Port Authority (JCPA) is coordinating with the NPS and is applying for a Special Use Permit with NPS/GUIS. The permit application includes appropriate language/provisions to protect shorebirds. In addition, the current dredge placement alternatives do not include placement of material on Spoil Island. Appropriate dredged material (sandy sediments) will be placed in the LZA in shallow nearshore waters (–14 feet to –22 feet MLLW).In addition, the proposed project will not impose noise and/or visual disturbances to shorebirds beyond that routine maintenance dredging by the USACE-Mobile District. Maintenance dredging occurs every 42 to 72 months as necessary to maintain the channel between Petit Bois and Horn Island. Marine and coastal birds have been exposed to the noise and other effects of dredging and may have become habituated to the process.

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6F	Gregory Hogue (cont.)	Letter	Federal Government	U.S. Department of the Interior Office of Environmental Policy and Compliance	75 Spring St., S.W., Atlanta, Georgia 30303	404/331-4524	joyce.stanley@ios.doi.gov	Land Use	WildernessIn 1978, Horn and Petit Bois Islands were designated wilderness by Congress in P.L. 95-625 through the establishment of the Gulf Islands Wilderness Area. The islands are managed to maintain their primeval character in accordance with the Wilderness Act of 1964 (P.L. 88-577) whose purpose is to establish an enduring and unimpaired wilderness resource, where nature predominates, for public use and enjoyment. Wilderness status places significant restraints on possible developments on the islands and requires substantial measures be taken to guarantee an undisturbed, wilderness experience for visitors. Any significant activities near these islands must consider intangible wilderness values such as visibility, night sky conditions, acoustic conditions, and solitude, which have consistently been held to be critical components of wilderness.Wilderness resources were not evaluated as part of the SEIS. Any decision by the Army Corps of Engineers to utilize equipment on Petit Bois Island to facilitate the proposed maintenance activities must be evaluated by the NPS in accordance with the Gulf Islands Wilderness Management Plan. A "minimum tool" evaluation must be completed and approved before equipment would be allowed on the island. Unfortunately, during previous projects, equipment has been mobilized without this evaluation and coordination.	To ensure protection of GUIS natural resources, no activities associated with the proposed project will be undertaken on or proximate to the GUIS without coordination through the NPS/GUIS and the special use permit. Equipment and staging activities will not occur on Petit Bois or Horn Island during channel widening activities. Future maintenance of the proposed channel widening is not part of the proposed project. The affected environment and environmental consequences of future maintenance activities are being addressed as part of the Civil Works EIS and Feasibility Study being prepared concurrently by the USACE Planning Division to evaluate whether there is a Federal interest in assuming maintenance of the widened channel (Public Law (PL) 99-662; 33 U.S.C. 2232, as amended). It is anticipated that the excavated area (or channel improvements) would become part of the Federal Navigation Channel and that the Federalgovernment would assume maintenance of the widened channel (pending approval of the USACE Civil Works EIS/Record of Decision).
6G	Gregory Hogue (cont.)	Letter	Federal Government	U.S. Department of the Interior Office of Environmental Policy and Compliance	75 Spring St., S.W., Atlanta, Georgia 30303	404/331-4524	joyce.stanley@ios.doi.gov	Hazardous, Toxic, and Radioactive Waste	Biological ImpactsIn the wake of the Deepwater Horizon MC252 oil spill, it may be necessary to re-evaluate the biological impacts of the proposed action. What may have previously been a temporary disruption or short-term minor displacement of certain species may now be a more significant impact as a result of the oil spill. Unfortunately, it may be some time before the long-term biological effects of the spill are fully determined. In the case of benthic invertebrates, fish, mollusks, crustaceans, and other marine species, suitable stocks for recruitment and recolonization of dredge and disposal areas may not be readily available. Recovery times for species abundance, diversity, and biomass should be expected to increase substantially. Additionally, due to disruptions to many marine and coastal birds and threatened and endangered species such as sea turtles as a result of oil spill response activities, it is more important than ever to implement seasonal timing of project activities to avoid critical nesting periods and seasons when these species are present. Limiting construction activities and placement of materials to the months of November through February will greatly enhance the protection of these species.At the very least, the cumulative impacts evaluation needs to now consider the collective impacts of the proposed action in conjunction with the MC252 oil spill. Similarly, any dredging areas should also be surveyed in advance and verified to be devoid of any residual DWH/MC252 oil product prior to dredging and deposition of any sand within the littoral system and/or land.	Research on the short- and long-term biological effects of the Deepwater Horizon MC252 on benthic invertebrates, fish, mollusks, crustaceans, and other marine species is currently underway but results are currently unknown. The study area and the general area of the Mississippi Sound and barrier islands in which the project is proposed were not extensively oiled (as compared to Louisiana) and suitable stocks for recruitment and recolonization are expected to be readily available. As discussed in Section 3.10 and Appendix B of the EIS, EA Engineering, Science, and Technology, Inc. conducted sediment characterization sampling in the project area in early April 2010 prior to the Deepwater Horizon oil rig explosion and spill. Sediment characterization sampling was again conducted in late-November to early-December 2012. Comparison of the two data sets was conducted to determine if sediment quality had been affected by the Deepwater Horizon oil spill. According to EA 2011b "Based on results of PAH and total petroleum hydrocarbon (TPH) testing of surface sediments collected in the Bayou Casotte and Pascagoula Lower Sound Channels, two EPA-designated reference sites, and the Pascagoula ODMDS in November and December 2010, there were no discernable changes noted in the sediment quality that could be attributed to the Deepwater Horizon Oil Spill." In addition, sediments in the study area were tested for PAHs and no contamination was documented following the Deepwater Horizon oil spill, (Section 4.13.1.2). Within the study area, channel maintenance dredging regularly occurs and it is likely that most resident marine and coastal birds have become acclimated. Additionally, the project does not include any work or placement of dredge material on subaerial land forms, further reducing the likelihood of affecting courting, breeding, and raising of marine and coastal birds or affecting nesting of sea turtles. Best management practices (BMPs) to avoid take of sea turtles while dredging are included in the Dredge Material Management Plan.

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6H	Gregory Hogue (cont.)				75 Spring St., S.W., Atlanta, Georgia 30303	404/331-4524	joyce_stanley@ios.doi.gov	Mitigation	Summary Comments:Gulf Islands National Seashore was established by Congress in 1971 (P.L. 91-660, 84 Stat. 1967, 16 U.S.C. 459h) "to preserve for public use and enjoyment certain areas possessing outstanding natural, historic, and recreational values." As part of the coastal barrier island system, the gulf islands are among the most prime examples of intact coastal barrier ecosystems that remain of a natural ecological continuum extending from Cape Cod to Mexico. As such, the legislation directs the Secretary of the Interior to administer the park in accordance with the Act of August 25, 1916 (30 Stat. 535) "for the conservation and management of wildlife and natural resources."We highly recommend the following to minimize the impacts to this resource of national significance:1. Seasonal timing of all construction activities should be incorporated into project implementation. Dredging and sediment disposal have a significant potential to impact many of the biological communities on and around the park islands if the activities are not timed correctly to avoid periods of high or seasonal activity. In order to avoid substantial disturbances to nesting sea turtles, nesting shorebirds, and other wildlife, and to minimize project affects on the visiting public, construction activities within the Bar Channel and placement of materials should be limited to the months of November through February. Potential impacts to most rare, threatened, and endangered species would be avoided by following this schedule. 2. All suitable island sediments should be retained within the natural transport system. No beach quality sand (grain size, color, and texture) should be disposed of in offshore areas. Disposal of island sediments offshore is detrimental to a system already in a sand-deficit situation and only continues the interruption of the natural sand supply resulting in receding beaches and reduction in island width and elevation. 3. Littoral zone disposal should be redefined as shallow areas of 12 ft or less and should be used for disposal of all suitable sediments not otherwise deposited directly on the islands. In depths greater than 12 ft, the sediment cannot be properly reworked and distributed along the downdrift island. The littoral disposal zone should be relocated to a suitable shallow area where depths are less than 12 ft. 4. Since environmental conditions have changed significantly as a result of the Deepwater Horizon MC252 oil spill from when the SEIS evaluations were performed, the biological impacts associated with the proposed action should be reassessed. It is expected that suitable population stocks for recruitment and recolonization of dredge and disposal areas may not be readily available and recovery times for species abundance, diversity, and biomass are expected to increase substantially. At the very least, the cumulative impacts need to now consider the collective impacts of the proposed action in conjunction with the DWH/MC252 oil spill.	1. To ensure continued protection of the natural resources of the GUIS, activities associated with the proposed project will be coordinated and permitted through a special use permit from the NPS/GUIS. Conditions established by NPS/GUIS will be followed. 2. As detailed in Section 2.2.3 Dredged Material Management, dredged material with sand content suitable for beneficial use would provide material for habitat restoration activities in shallow nearshore waters (–14 feet to –22 feet MLLW). Granular and sandy materials are appropriate for beach nourishment, parks, turtle nesting beaches, bird nesting islands, wetlands restoration and/or establishment, and many other applications. Dredged material with appropriate sand content may also be placed in the LZA and would increase the amount of sediment (particularly sand) transported along the coast at an angle to the shoreline (also known as littoral drift, thereby helping to restore the sands deposited to the barrier islands via littoral currents. 3. The LZA is a permitted site from -14 feet to -22 feet MLLW. Changing it is outside of the scope of the EIS and would require reevaluation from multiple agencies. Thus placement of suitable dredge material in -12 MLLW would be in violation of the LZA permit. 4. As discussed in Section 3.10 and Appendix B of the EIS, EA Engineering, Science, and Technology, Inc. conducted sediment characterization sampling in the project area in early April 2010 prior to the Deepwater Horizon oil rig explosion and spill. Sediment characterization sampling was again conducted in late-November to early-December 2012. Comparison of the two data sets was conducted to determine if sediment quality had been affected by the Deepwater Horizon oil spill. According to EA 2011b "Based on results of PAH and total petroleum hydrocarbon (TPH) testing of surface sediments collected in the Bayou Casotte and Pascagoula Lower Sound Channels, two EPA-designated reference sites, and the Pascagoula ODMDS in November and December 2010, there were no discernable changes noted in the sediment quality that could be attributed to the Deepwater Horizon Oil Spill." In addition, sediments in the study area were tested for PAHs and no contamination was documented following the Deepwater Horizon oil spill, (Section 4.13.1.2). Furthermore, Research on the short- and long-term biological effects of the Deepwater Horizon MC252 on benthic invertebrates, fish, mollusks, crustaceans, and other marine species is currently underway but results are currently unknown. The study area and the general area of the Mississippi Sound and barrier islands in which the project is proposed were not extensively oiled (as compared to Louisiana) and suitable stocks for recruitment and recolonization are expected to be readily available. Within the study area, channel maintenance dredging regularly occurs and it is likely that most resident marine and coastal birds have become acclimated. Additionally, the project does not include any work or placement of dredge material on subaerial land forms, further reducing the likelihood of affecting courting, breeding, and raising of marine and coastal birds or affecting nesting of sea turtles. Best management practices (BMPs) to avoid take of sea turtles while dredging are included in the Dredge Material Management Plan
6I	Gregory Hogue (cont.)				75 Spring St., S.W., Atlanta, Georgia 30303	404/331-4524	joyce_stanley@ios.doi.gov	Marine Aquatic Communities	Section 3.13.2, Non-native and Invasive Aquatic Fauna Species. The document states that the Nonindigenous Aquatic Species Databases does not contain the lionfish. This is incorrect. Data for the lionfish are available from the Nonindigenous Aquatic Species Database. http://nas.er.usgs.gov/queries/SpeciesMap.aspx?SpeciesID=963.	Although lionfish have been collected offshore from Alabama and Louisiana, species distribution map for the lionfish does not indicate specimens collected within the study area of the EIS (http://nas2.er.usgs.gov/viewer/omap.aspx?SpeciesID=963). Lionfish will not be added to Section 3.13.2. The lionfish is not listed as occurring in HUC 31700 - Pascagoula or neighboring HUCs: 31401 - Florida Panhandle Coastal; 31602 - Mobile Bay/Tombigbee; 80901 - Lower Mississippi New Orleans; 80902 - Lake Pontchartrain; or 80903 - Central Louisiana Coastal (http://nas.er.usgs.gov/queries/huc6se.aspx). Text in the EIS has been revised appropriately.

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7A	Heinz J. Mueller	Letter	Federal Government	U.S. Environmental Protection Agency	61 Forsyth St., Atlanta, Georgia 30303-8960	404/562-9386		Proposed Project	Pursuant to Section 309 of the Clean Air and Section 102(2)© of the National Environmental Policy Act (NEPA), EPA, Region 4 has reviewed the subject document. The U.S. Army Corps of Engineers (USACE) project evaluates the consequences of the Jackson County Port Authorities proposal to widen the Pascagoula Lower Sound/Bayou Casotte Channel segment from the Federally authorized width of 350 feet and depth of -42 feet mean lower low water (MLLW) (with 2 ft of allowable over-depth and 2 feet of advanced maintenance) to a width of 450 feet, parallel to the existing channel centerline and to the existing authorized depth of -42 feet MLL. The project also involves the limited widening of the northern portion of the Horn Island Pass channel in the Port of Pascagoula.The primary purpose and need for the proposed widening is to alleviate current vessel restrictions and increase travel efficiencies for marine vessel moving into and out of Pascagoula and Bayou Casotte Harbor. According to the DEIS, �economic pressure and technological advances have generally resulted in a trend towards the production of larger ships, which has increased channel improvement needs.� Specific benefits anticipated include transit during dark hours for crude oil tankers (in ballast) and Panamax bulk carriers. Other benefits include �transit of liquefied natural gas tankers during high wind and current condition, two-way traffic under established conditions and improved terminal operations and increased productions hours due to decreased number of delays.�Three alternatives are examined in the DEIS, Including a no-action and two action alternatives (i.e., widening locations and disposal sites). Enlarging the Harbor requires dredging of approximately 38,200 feet (7.2 miles) of the channel. The DEIS identifies a preferred alternative that involves dredging adjacent to the existing Pascagoula Lower Sound/Bayou Casotte Federal Chanel segment to widen the channel 100 feet on the west side to the existing depth of -42 feet MLLW (with authorized advanced maintenance and allowable over depth excavation consistent with the Federal project) as opposed to widening the channel 50 feet on either side of the existing Channel segment. This alternative was selected because it alleviates more of the existing vessel transit restrictions (e.g., eases turns) than the project.According to the DEIS, the project will result in the conversion of 87.6 acres of shallow habitat to deeper habitat and the disposal of approximately 3.4 million cubic yards of dredge material from the channel modification. The implementation of the preferred alternative will involve the placement of approximately 3.7% (125,000 cy) of material in the designated littoral zone area (LZA) for beneficial use and the rest of the material (approx. 3.3 mcy) in the Pascagoula Offshore Disposal Management Disposal Site (ODMDS). While both action alternatives will include relatively similar amounts of new dredge volume, the preferred alternative will result in a smaller amount of material being used for beneficial reuse. Most of the material will be hydraulically excavated by a hopper dredge, but some combination of hydraulic pipeline or mechanical dredge may also be used. In terms of sediment quality, the DEIS indicates that certain samples are above the lead and dioxin criteria levels. The dioxin TEQ value exceedances were attributable to the least toxic congener, indicating little likelihood of adverse impacts of dioxin congeners in sediments. Prior to placement of dredged material, concurrence by EPA is needed as to whether or not these findings meet guidance for the Limiting Permissible Concentrations (LPC) for lead and dioxin congeners in sediments.	Summation is correct.

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7B	Heinz J. Mueller (cont.)	Letter	Federal Government	U.S. Environmental Protection Agency	61 Forsyth St., Atlanta, Georgia 30303-8960	404/562-9386		Proposed Project	Based on our review of this project, we have assigned a rating of EC-1. (environmental concerns, adequate information) to the DEIS. EPA notes that there may be sediment quality issues related to lead and/or dioxin as well as some short term water quality impacts associated with the dredging and placement process. Therefore, please note that there will be separate evaluation and communication regarding Marine, Protection, Research, and Sanctuaries Act, Section 103 process including the evaluation of supporting sediment physical, chemical, and biological testing reports, as well as the District Engineer's determination of the material's compliance with the Ocean Dumping Regulations. This review process will occur following the submittal of the DEIS comment letter. In addition, EPA recommends that every effort be made to institute appropriate control measure to reduce potential water quality impacts. In general, we commend the USACE on the beneficial use of some of the material, but would like to more material used in other areas along the Gulf Coast even though we understand that the transport costs can be cost prohibitive. We appreciate your coordination with us. The EPA technical contacts will be Doug Johnson (404/562-9386) located in our Water Management Division, while our NEPA contact will be Ntale Kajumba (404/562-9620) of my staff.	USACE submitted letters to EPA on November 14, 2011 and June 12, 2012 requesting concurrence on their determination regarding Section 103 MPRSA (included in Appendix D). Additional correspondence on this subject will be included in the Administrative Record, and Record of Decision as appropriate. The EPA response has been received and is included in Appendix H.
7C	Heinz J. Mueller (cont.)	Letter	Federal Government	U.S. Environmental Protection Agency	61 Forsyth St., Atlanta, Georgia 30303-8960	404/562-9386		Proposed Project	Additional Comments for the ODMDSThe FEIS should discuss the proposed action in context of the ODMDS' Site Management and Monitoring Plan, see: http://epa.gov/region4/water/oceans/documents/Pascagoula SMMP.pdf. The DEIS (p.3-6) does not appear to address the available capacity directly in volume available for the proposed action, e.g., how much of the existing ODMDS is committed to other project uses? The DEIS does not appear to address impacts to the existing ODMDS, e.g., how much is available for the proposed action's identified need?Recommendation: The FEIS should clarify how much of the existing project is committed to other project uses and how much is available for the proposed action?	In 1991 the Pascagoula ODMDS was designated by the EPA for both new work and maintenance material generated by the Pascagoula Harbor Channel area executed by both public and private entities (Anchor QEA 2012, Appendix B). The site is located just south of Horn Island and is bounded by Horn Island to the north, the Pascagoula Harbor Navigation Channel to the east, the navigation safety fairway to the south, and a north-south line running through Dog Keys Pass to the west. The ODMDS ranges from depths of about –38 feet MLLW in its northern portion to over –52 feet MLLW in its southern portion (EPA and USACE 2006, Anchor QEA 2012). Placement of dredged material at the ODMDS is restricted to depths below –20 feet MLLW. Offshore hydrodynamic conditions at the Pascagoula ODMDS site, such as tropical storms, promote erosion and off-site dispersion of newly placed dredged material. Therefore the SMMP establishes a 10 mcy threshold for evaluation of dispersive nature, and long and short term capacity of new work volumes. The estimated volume of sediments to be placed at the ODMDS under the preferred alternative is 3.3 mcy, which is below the threshold. In addition, conservative estimates of available capacity have been developed based on data available from SMMP. Estimated dredged material volumes placed at the ODMDS through 2010 range from 50 to 80 mcy and projected estimates for the 10 years following 2006 (i.e., through 2016) are 3 to 8 mcy. Dredged material is placed in a designated portion of the ODMDS site until the depth limitations are reached before beginning placement in another designated portion of the ODMDS. Consequently, a conservative estimate of remaining capacity of the ODMDS can be calculated based on the areal extent of the ODMDS site that has not been designated for use. Using the coordinates of the designated ODMDS and the designated portions in use for sediment placement, the remaining areal extent available is 26.9 square miles.Therefore, the Pascagoula ODMDS has ample capacity to accommodate the proposed project

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8A	Andrew Whitehurst	Letter	NGO	Gulf Restoration Network	338 Baronne St., Suite 200, New Orleans, LA 70112	504/525-1528		Proposed Project	I am writing on behalf of the Gulf Restoration Network (GRN), a network of over 50 local, regional, and national environmental and public interest groups dedicated to uniting and empowering people to protect and restore the natural resources of the Gulf Region. We submit these comment in response to an application for a permit, pursuant to Section 404 of the Clean Water Act and with respect to the Draft Environmental Impact Statement prepared for the project (33 U.S.C. Section 1344), submitted to the U.S. Army Corps of Engineers (hereinafter "the Corps"). GRN has serious concerns with the application for a 404 permit submitted to the Corps by the Jackson County Port Authority to widen the Pascagoula Lower Sound and Bayou Casotte Federal Channel. Our comments are made in response to the subject matter of the project's Draft EIS as follows.	

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8B	Andrew Whitehurst (cont.)	Letter	NGO	Gulf Restoration Network	338 Baronne St., Suite 200, New Orleans, LA 70112	504/525-1528		Project Alternatives	1. Beneficial use of dredge spoil material: comparison of Alternatives 1 and 2. Alternative 1 dredges 100 feet of additional width on the western side of the existing channel. The EIS mentions that the present 42 foot deep, north-south oriented Bayou Casotte channel has interrupted longshore sediment transport by entraining and trapping sediment particles that otherwise would migrate east to west with currents. These sediments transported by longshore currents have built and nourished the barrier islands over time. Deep channels, such as this one, have interrupted the island building process since the early 1900s and all of Mississippi's barrier Islands have decreased in square area in the past 100 or so years. The sediment movement has been interrupted by the deep channels that have acted as traps, with heavier transported particles, such as sand, falling out of suspension and accumulating on the east side of the present navigational channel, while lighter sediments such as silts and clays have accumulated on the west side of the present channel. The dredging activity recommended in Alternative 1 will dredge and remove bottom sediments to widen the channel by 100 feet from the western edge of the present channel where more clay and silt particles have accumulated.Alternative 2 would also increase the channel by 100 feet of width by dredging 50 feet from both the east and west sides of the present channel, and would capture proportionately more sand in the dredging process because more sand has accumulated on the east side of the present channel. The nature of the dredged sediment-specifically the proportion of available sand - removed by Alternatives 1 and 2 is different. This produces different beneficial use outcomes. Alternative 1 will produce 3,390,000 cubic yards (cy) of spoil sediment of which only 3.7% or 125,000 cy is sand - useful in barrier island nourishment. Alternative 2 is estimated to produce 3,290,000 cubic yards of spoil sediment of which 9.6% or 315,000 cy is sand. Alternative 2 produces more sand for beneficial use. There are two areas planned for disposal of the sediment produced by dredging: the Littoral Zone Area or LZA, a small area at the east end of Horn Island, and the Ocean Dredged Material Disposal Site (ODMDS) which is much larger and farther west on the Gulf side of Horn Island. The LZA at the east end of Horn Island is the only area that provides a quantifiable beneficial use of sediments because the sand portion of the dredge spoil placed there can move in longshore currents and nourish or replenish the barrier islands, especially Horn Island. In dredging alternative 1 or 2, the predominantly sand portion of the dredge spoil placed at the LZA will provide a beneficial use. The remaining dredge spoil, composed mostly of silt and clay, will be deposited at the deeper ODMDS site which does not provide a beneficial use. It is an existing spoil disposal site south of Horn Island and its role in providing sediments for longshore transport for barrier island replenishment is unknown. The dredging plan in Alternative 2 is estimated to yield 2.5 times the amount of sand and thus 2.5 times the beneficial use of dredge spoil material of Alternative 1. Alternative 1 also costs $3,900,000 more than Alternative 2. Dredging both sides of the present channel 50 feet wider is less costly than dredging the west side 100 feet wider, and there is a 2.5 fold increase in the estimated amount of sand available for beneficial use in the Horn Island LZA spoil disposal area.	Summation is correct. Both Alternative 1 and Alternative 2 include beneficial use of dredge material. While Alternative 2 may provide more dredge material for beneficial use (due to the characterization of the sediment to be dredged), Alternative 1 is preferred for navigation/operational reasons.

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8C	Andrew Whitehurst (cont.)	Letter	NGO	Gulf Restoration Network	338 Baronne St., Suite 200, New Orleans, LA 70112	504/525-1528		Proposed Project	2. Identification of the Environmentally Preferred Alternative. The Alternatives analysis rejects all but two of the plans and chooses Alternative 1 over Alternative 2. Modeling of ship passage was performed to optimize a design that would allow larger ships (Panamax container ships) and more high profile ships (LNG tankers) to have enough room to maneuver under heavy wind conditions or at night in a widened channel, thus avoiding navigation restrictions that have been in place on the present channel. The Pascagoula Bar Pilots and other shipping interests wanted shipping transit in the channel to be more efficient, and less restrictive. Dredging 100 feet from the west side to widen the channel according to Alternative 1 is said to provide better turning lanes for ships in two key areas of the Bayou Casotte Channel. The more western alignment of Alternative 1 also keeps the channel away from the industry dock terminals on the east bank when the channel reaches the mouth of Bayou Casotte. These factors are favored by the proponent of this project, the Jackson County Port Authority. Also, five fewer navigational markers must be relocated if Alternative 1 is chosen. However, in EIS Chapter 10.1, titled "Identification of the Environmentally Preferred Alternative," the following is written:"Although there is a negligible difference in environmental impacts between the two alternatives, for navigation reasons, the applicant's preferred alternative is Alternative 1, widening the existing channel by 100 feet on the west side of the channel. Therefore, Alternative 1 is designated as the environmentally preferred alternative."	40 CFR Part 230 Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material requires an analysis of alternatives that meet the overall project purpose, and analysis of the practicability of each alternative. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. The overall project purpose of the proposed project is defined in Section 1.4 of the EIS as ?? to improve operating conditions and efficiency in the Pascagoula Lower Sound and Bayou Casotte channels and Bayou Casotte Harbor.' Two alternatives were evaluated in this EIS, and as discussed in Section 10.0, potential adverse impacts from both alternatives are the same/similar for most resources. Both Alternative 1 and Alternative 2 include beneficial use of dredge material. Only a small portion of the dredged material will be beneficially reused because material needed for beneficial use is limited to clean, sandy materials that are >70% sand. Alternative 2 provides more dredge material for beneficial use due to the characteristics of the sediment to be dredged; however, Alternative 1 does still provide approximately 125,000cy of material for beneficial use for littoral zone drift and replenishment. Alternative 1 is preferred for practicability/logistics reasons in light of the overall project purpose, including the increase in radius of turn from Horn Island Pass Channel to Lower Pascagoula Channel, and the radius of the available turning area at the entrance to the GLE dredged slip. Since Alternative 1 is more practicable, and Alternative 2 does not have less adverse environmental impact, Alternative 1 has been identified as the Environmentally Preferred Alternative. The proposed project presents an opportunity for the beneficial use (BU) of the dredged material; however, the sediments placed in the LZA must consist of predominantly sands. As a result, this option is only viable for a portion (125,000 cy, or 3.7 percent) of the estimated new work volume

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8D	Andrew Whitehurst (cont.)	Letter	NGO	Gulf Restoration Network	338 Baronne St., Suite 200, New Orleans, LA 70112	504/525-1528		Water Quality	3. Bayou Casotte water quality problems due to ammonia, pathogens and increased salt water volume from a wider channel.Under either Alternative 1 or 2, 100 feet of width added to the 42 foot deep Bayou Casotte channel will allow a greater volume of salt water to enter the bayou at its mouth. According to the EIS section 4.9.2, increasing the volume of salt water entering the bayou from the Gulf has the potential to reduce the dilution effect of the fresh water from Bayou Casotte on effluents released there.Bayou Casotte has ongoing water quality impairments due to bacteria and ammonia (EIS Chapter 3.9.2), It is important for the Bayou to maintain its capacity to assimilate pollutants from point source discharges such as the NPDES discharge from Mississippi Phosphates. This is a point source that adds ammonia, among other pollutants, to the Bayou. The loss of dilution is particularly problematic at low tide due to the decreased volume of water available to mix with the discharged effluent from a permitted facility such as this. Bayou Casotte's ammonia problem is documented in a 2007 TMDL for Ammonia. The EIS section 4.9.2 provides: "Based on elutriate sampling (USACE 2010), the Preferred Alternative is expected to result in un-ionized ammonia values that exceed both the chronic (0.035 mg/l) and acute (0.0233 mg/l) guidance criteria levels used in the Bayou Casotte TMDL (EPA 2007a)." Un-ionized ammonia is toxic to fish, crabs, shrimp and mollusks due to its interference with respiration at the gill site, and its toxicity depends on pH in ambient water. Salt water pH is much more stable than fresh water pH due to adequate buffering capacity, but in the confines of Bayou Casotte, fresh and salt waters are present in varying proportions on a daily basis and pH could fluctuate due to tidal action and make un-ionized ammonia more toxic. Dilution must be adequate so that toxicity from ammonia is not a problem from this project. The additional salt water volume from a wider channel makes dilution an issue for ammonia toxicity in Bayou Casotte which is already known to have problems from ammonia pollution (2007 TMDL). As part of preparing the bayou environment for additional salt water it may be necessary to curtail ammonia discharges from Mississippi Phosphates by requiring more rigorous treatment of water before it is released as effluent into Bayou Casotte.Bayou Casotte also has impairments from pathogens such as fecal coliform and *enterococci* bacteria. Two monitoring stations on Bayou Casotte are sampled for these pathogens in the MDEQ's beach monitoring program and have exceeded bacteria criteria in Mississippi's state water quality standards. (EIS 3.9.2) Again, if dilution is inadequate, the pathogen problem will persist. A 100-foot increase in channel width will produce a broader salt water wedge or an increased density current, which will provide a greater volume of salt water that can affect Bayou Casotte. Since the channel is not being deepened, the salt wedge that moves up and down Casotte with usual tidal action will not necessarily go farther up the bayou than it does at present. But a broader salt wedge will raise average salinity due to the greater volume of salt water that it transports on incurrent tides (EIS 4.9.2). This situation leaves Bayou Casotte with no fewer pollutants to dilute, but a greater volume of salt water that will combine with and reduce the amount of fresh water needed to dilute and assimilate them.If either Alternative 1 or 2 is chosen and implemented, the physical fact of increased salt water volume in Bayou Casotte and its tidal environment is a problem that will exacerbate well documented pollution problems due to ammonia and pathogens.	The effects of the proposed project on water chemistry, including salinity, ammonia, bacteria, and other water quality constituents in the study are detailed in section 4.92 of the EIS. The text in the EIS section 4.9.2 seems to have been interpreted to suggest that having a larger portion of waters with a higher salinity would cause problems with either bacteria or ammonia. However, the analysis presented in section 4.92 demonstrates that the increased tidal volume due to channel widening will remained stratified with respect to salinity and therefore, no adverse impacts in the freshwater-saltwater mixing zone in this stratified system are anticipated, i.e., no adverse impacts to the freshwater volume into the bayou are anticipated. In addition, the volume of freshwater flowing into the bayou will not change as a result of the proposed project and therefore, the effect of freshwater dilution on the constituents of concern (e.g., ammonia, bacteria) will not change. For clarification purposes, the sentence in section 4.9.2 of the EIS now states: The proposed channel will be larger than the existing channel, thereby increasing the volume of saltwater entering Bayou Casotte from the Gulf and potentially reducing the dilution effect of the freshwater from Bayou Casotte on salinity in Mississippi Sound.

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8E	Andrew Whitehurst (cont.)	Letter	NGO	Gulf Restoration Network	338 Baronne St., Suite 200, New Orleans, LA 70112	504/525-1528		Sediment Quality	4. Polluted sediments in dredge spoil material.Bayou Casotte has been an active port for many decades and now serves the petrochemical industry and other heavy industries. From the sediment testing done in conjunction with this EIS, it is apparent that the channel bottom sediments in the project area, at varying distances south from the mouth of the bayou, contain a variety of toxic pollutants that will be dug, disturbed and moved during this dredging project. Sediment sampling and monitoring was conducted as part of the development of the EIS and provides an opportunity for discussion of some of the problematic toxic compounds, metals and chemicals that will be encountered by marine organisms when the sediments are dredged and later released into the water column for placement at one of two open water disposal sites, the EZA site at the East end of Horn Island, and the ODMDS further to the southwest.Chemicals know to be carcinogenic and capable of bioaccumulation in animal tissue such as PCBs, Dioxins, and organochlorine pesticides such as DDT were found in elutriates made of sampled sediments. Various polycyclic aromatic hydrocarbons (PAHs), and metals such as Arsenic, Cadmium, Chromium, Lead, Mercury and Nickel were also found in elutriates. Not all were found at levels deemed excessive.Concurrence of EPA will be required before placement of dredged materials containing lead, dioxins, and the SVOC chemical bis(2-ethylhexyl) phthalate. In addition to testing sediment elutriates, bioaccumulation studies were conducted with marine sandworms and bluntnose clams. The tissue concentrations that resulted from exposure to lead in sediment bioassays were found to be higher than background tissue concentrations in EPA region 4, which includes Mississippi. (Appendix F II c. 2(c)) From similar bioassays, dioxin and SVOC levels also exceeded EPA region 4 background levels in test and reference sites. (Appendix F. ibid). The form of dioxin that was found in excessive levels was one of the dioxin congeners considered to have low toxicity compared to other forms, however, dioxins not only accumulate in living tissue, but are mutagens no matter their relative reactivity. The fact that one of the least toxic forms was present in sampled sediments should not lessen concern over health effects – millions of cubic yards of dioxin-polluted sediment will be mixed into Gulf waters and settle on the bottom where benthic marine organisms will come into contact with them and introduce them into the marine food chain.Sediment elutriate samples containing dissolved cyanide and ammonia caused management recommendations to be written into the EIS so that proper dilution occurs when the dredge spoil is placed in the two open water disposal sites. Modeling indicated that placement of dredged materials will require a 318-fold dilution of full strength elutriate concentration which would be expected within 4 hours following placement at the ODMDS or LZA sites. (EIS 4.9.2) If this is true, the method might be adequate for meeting guidance criteria levels found in the Bayou Casotte TMDL for both ammonia and dissolved cyanide. If this modeled dilution factor is not accurate, then disposed sediments may produce toxic amounts of ammonia that will harm benthic invertebrates and fish. Under the best conditions, if the EPA is consulted as required, and if dredging contractors follow dilution recommendations as described above, disposal of the three million cubic yards of dredge spoil from the channel project will unavoidably move and mix toxic substances into the water column and leave them exposed on the bottom of the nearshore Gulf waters at the two disposal sites. This is a troubling scenario for the health of the marine environment, and for the health of humans who might consume seafood exposed to the toxic substances. Laboratory bioassays completed for this EIS prove that toxics in sediments in the project area are assimilated and acc	The dilution ratios anticipated (Anchor QEA 2012) are sufficient to ensure that that sediment quality guidance criteria thresholds are not exceeded for the contaminants of interest. The 318-fold dilution was not a “requirement” for sediment elutriate samples to meet quality standards, it was the dilution expected within a 4-hour period, In contrast, levels of nickel and copper in sediment porewaters exceeded guidance criteria by 8 fold, levels of Endrin exceeded guidance criteria by a factor of 3.4, and Heptachlor concentrations exceeded guidance criteria by 2.0 and 6.7 fold. Therefore, dilution ratios described by Anchor QEA (2012) indicate sufficient dilution of contaminated sediment porewaters should occur such that guidance criteria thresholds are not exceeded for these contaminants. As described in Appendix B and section 4.10 of the EIS, sediment testing using established EPA standards concluded that project materials will not result in bioaccumulation and would be acceptable for disposal at the ODMDS, consistent with EPA criteria for evaluation of potential contaminant-related environmental impact of the ocean disposal of dredged material. EPA concurrence is anticipated by September 15, 2012.

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8F	Andrew Whitehurst (cont.)	Letter	NGO	Gulf Restoration Network	338 Baronne St., Suite 200, New Orleans, LA 70112	504/525-1528		Marine Aquatic Communities	5. Effects on Essential Fish Habitat from channel creation and spoil disposal at ODMDS and LZA.The study area includes Essential Fish Habitat (EFH) for adult and juvenile brown, pink and white shrimp, Gulf stone crab, blacknose shark, spinner shark, finetooth shark, bull shark, blacktip shark, Atlantic sharpnose shark, scalloped hammerhead shark, great hammerhead shark, bonnethead shark, cobia, greater amberjack, lesser amberjack, gray snapper, little tunny, king mackerel, Spanish mackerel, red snapper, and lane snapper.Increased turbidity is one result of the dredge spoil placement at the two disposal sites near Horn Island, and adult fish are capable of moving away from water quality problems such as this. Effects on eggs larvae and juveniles are different as these early life stages cannot move away as readily as adults of pelagic species. Larvae and eggs in the high sediment zone will not do well and will be likely to suffer abrasion, burial, sensitivity to elevated concentrations of suspended sediments, and outright mortality. (EIS 4.13)Burying by disposed sediments in the open water disposal areas is not the only factor that will affect marine organisms. The conversion of 87.6 acres of shallow soft bottom to deeper, less productive habitats is predicted for this project. This is 0.01% of the bottom area of the Mississippi Sound, but the loss of these shallow habitats in the Mississippi Sound has been a cumulative process as channels have been cut and maintained beginning in the late 1800s. Much has been lost up to this point through the construction of the harbor approach channels and the Gulf Intracoastal Waterway channel. More conversion of shallow habitats is planned in channel projects in other parts of the Mississippi coast, such as the Gulfport Harbor expansion. It will cause the loss of shallow soft bottoms partly by filling and partly by dredging. These 87.6 acres are the latest planned conversion of shallow bottoms to deep channel, but they follow a long line of previous projects. They also will not be the last acres lost.Changing bathymetry or bottom contours in a shallow coastal area has the capacity to change water quality as a result - one cumulative effect discussed in Appendix F is the conversion of shallow silty clay bottom to less productive deep habitats that "most likely will be hypoxic with dissolved oxygen levels below 2 mg/l." This is a physical change to the bottom that produces a change in the physical characteristics of water. These deep areas are unproductive and can have water quality that changes them into marine dead zones.	Potential impacts to EFH are fully disclosed in the EIS both in the project specific analysis (section 4.13.1) and as part of the cumulative impacts analysis (section 5.4.12). As presented in section 5.4.12, the proposed project would convert approximately 87.6 acres of shallow bottom habitat to deeper, hypoxic habitat, and reduce amount of habitat for federally managed species. However, the overall cumulative conversion of habitat is minor compared to the entire areal extent of Mississippi Sound, and no seagrasses will be impacted since seagrasses are absent from the project area. The 87.6 acres of shallow water habitat to be converted to deeper habitat is presently impaired due to proximity to the existing channel and associated regular maintenance dredging. In accordance with the Magnuson-Stevens fishery Conservation and Management Act, USACE has consulted with the National Marine Fisheries Service (NMFS) regarding impacts from the proposed dredging and placement of dredged material on EFH. The EFH Assessment, including proposed mitigation measures, have been submitted to the NMFS. NMFS role is to provide EFH Conservation Recommendations if it finds that the proposed actions would adversely impact EFH. The EFH assessment prepared to address potential impacts is provided in Appendix D (Agency Correspondence). The EIS discussed that the proposed project may affect coastal pelagic EFH due to changes in water quality including temperature, salinity, DO, and turbidity. These effects are expected to be short term and conditions are anticipated to return to baseline levels after project completion. Permanent effects on water temperature and DO may occur. However, the proposed channel widening is approximately 0.001 square mile of the total 1,850 square miles of Mississippi Sound and is not anticipated to impact the overall coastal processes or water quality in the Sound. The potential loss of 87.6 acres of benthic prey as a result of dredging is anticipated to be temporary and prey resources are expected to recover in a relatively short period of time. Over time, the converted area of habitat is expected to recover its function although with somewhat less productivity than pre-project conditions. The substrates will return to the same clay, silt, and sand bottom and benthic organisms will recolonize the area. Because of the potential effects listed above, the following mitigation measures are proposed as part of the EIS: • Avoid sensitive habitats such as seagrass or submersed aquatic vegetation (SAV) • Monitor water quality during dredging Channel maintenance dredging is anticipated every 3 years (Atkins North America 2012) and this recurring disturbance may limit the recovery of the converted habitat. However, the USACE is evaluating whether to assume maintenance of the completed Project under a Section 204(f) study and will address potential impacts to EFH from maintenance of the channel in the Civil Works EIS.

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8G	Andrew Whitehurst (cont.)	Letter	NGO	Gulf Restoration Network	338 Baronne St., Suite 200, New Orleans, LA 70112	504/525-1528		Threatened and Endangered Species	6. Effects on habitat for the threatened Gulf sturgeon from spoil disposal and channel creation.The Gulf Sturgeon is a threatened diadromous fish species known to live part of its life cycle in the waters adjacent to the Mississippi barrier islands. The project area includes sturgeon habitat and is generally south of the mouth of the Pascagoula River which has a well studied population of Gulf sturgeon. Sturgeon spawning takes place in the river system. Eggs hatch there and larvae develop into juveniles in fresh water. Juvenile sturgeon leave the river and move into the Mississippi Sound where they feed and live in the passes between the islands and in the waters adjacent to them. Adults migrate between the Sound and the river each year and ascend the rivers in late winter on spawning runs up the Pascagoula, Leaf, Bouie and Chickasawhay rivers. Gulf sturgeon also inhabit the Pearl River system in Mississippi and Louisiana. This population also utilizes the Mississippi barrier island habitats.During the time they spend in the waters of the Mississippi Sound and Gulf, juvenile and adult sturgeon feed on the bottom using their barbels and protrudable tubelike mouths to locate mollusks, worms, crustaceans and fish on or near the bottom. The large quantities of dredge spoil that will be deposited at the two open water disposal sites will cover bottoms with a murky layer of silt and clay and make them less productive. The spoil will also introduce displaced toxic compounds and metals (see discussion above) that will be available for biological accumulation in the marine organisms that comprise the sturgeon's diet. Thus, the Gulf sturgeon loses shallow bottom feeding habitats, and its benthic food sources are both smothered and polluted by dredge spoil. This channel project is a no-win situation for a bottom feeding animal such as the Gulf sturgeon that is protected by the Endangered Species Act.	The EIS fully analyzes and discloses potential impacts to Gulf sturgeon, a federally protected fish species. Effects on Gulf sturgeon discussed in a Biological Assessment (BA) prepared for this project are summarized in the EIS. As discussed in Chapter 4, Section 4.14.1.2, widening of the Pascagoula Harbor Navigation Channel would occur north of the barrier islands, within Gulf sturgeon critical habitat. The widening would result in permanent conversion of 87.6 acres of shallow, primarily silty clay soft-bottom habitats, representing approximately 0.01 percent of Mississippi Sound bottom, to deeper, hypoxic habitat. Water stratification and hypoxic conditions will most likely result in less-productive bottom conditions within the dredged area. Potential impacts to Gulf sturgeon as a result of the proposed project include temporary physical and behavioral impacts from noise, increased turbidity and suspended sediment, loss of benthic food resources, and entrainment during dredging activities. There are no long-term impacts to Gulf sturgeon anticipated with the project. The non-mobile benthic community in the project area may be temporarily adversely impacted as a result of the dredging and disposal operations. However, these impacts will not be significant due to recolonization by similar benthic species within a few months of completion of the project. Therefore, no long-term change in community structure is expected to occur. Dredging and disposal activities are not the only sources of physical disturbance to the benthos affecting macroinfaunal populations. Storm waves, tidal scour, vessel traffic, and trawling activities of commercial bottom fisheries all act to disrupt and suspend the finer sediments in estuarine and nearshore waters. These short-term perturbations, along with the constant sediment discharge of the area river systems, are much more common and, although not as disruptive in volume of sediment moved or deposited locally, are geographically widespread and equally as unpredictable to the infauna as dredging and disposal activities. These unpredictable, repeated disturbances act to keep the system in a state of continuous flux and high productivity.In accordance with the Endangered Species Act, USACE has consulted with the National Marine Fisheries Service (NMFS) regarding impacts from the proposed dredging and placement of dredged material to Gulf sturgeon and Gulf sturgeon critical habitat (as well as other threatened and endangered species in the area). NMFS' role is to evaluate the BA (deemed complete for review on June 11, 2012, included in Appendix D of the EIS), to determine whether a significant impact would result from the proposed project, and to document their evaluation/determination in a Biological Opinion (BO).The text in the EIS has been revised to reflect the clarification from the previous, similar comment/response related to benthic habitat.

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8H	Andrew Whitehurst (cont.)	Letter	NGO	Gulf Restoration Network	338 Baronne St., Suite 200, New Orleans, LA 70112	504/525-1528		Socioeconomics	7. Economic Effects of a wider Bayou Casotte Channel.The question of whether this channel project will add economic growth is handled with ambiguity in the EIS in the few discussions of jobs and increased port traffic. The executive summary handles the subject as follows: "no increase in terminal traffic is anticipated as a result of the project." Also, "Vessel transits are not anticipated to increase beyond that anticipated under the no-action alternative." In Chapter 2 of the EIS, the following statement is made: "no increases in vessel traffic beyond that anticipated without the project". The reader is led to believe, against reason, that this is a port improvement project that will make no difference in ship traffic at the port.Later, in EIS Chapter 3, it is revealed that Angola CNG, an LNG shipping company, will be sending ships regularly to Pascagoula's LNG terminal and that the company owns 60% of the capacity of the terminal. An Italian natural gas company, ENI owns 40% of the terminal. The price of natural gas in the US has dropped in the last year due to an abundance of gas produced domestically by hydraulic fracturing or "fracking". Numerous recent press stories have covered this issue and have projected that the US may be changing from an importer of natural gas to a net exporter. Natural gas prices have been dropping in the US as a result of rising supply. However, the LNG port that uses the Bayou Casotte channel can have increased traffic whether the US exports or imports liquefied natural gas. Increases in vessel traffic are almost inevitable if a wider channel is dredged. From the EIS discussion, it seems Angola CNG is waiting for the project to improve the channel. Restrictions exist on moving ships at night and on moving tall LNG carriers during high wind, and length restrictions are in place now on the channel. With the channel widened, these restrictions will be removed. Other types of ships not related to the natural gas industry will also be able to travel with fewer restrictions once the channel is dredged wider.Downplaying the economic impact that this channel improvement project will have on the port at Bayou Casotte or the port of Pascagoula as a whole is disingenuous. It is also puzzling. Why would a channel project with the environmental and marine habitat risks of the Casotte channel project be attractive and worth funding if it did not increase port business?Language found in Appendix F may better capture the true motivations for this project: "One of the long term impacts associated with the listed project will be increased economic opportunity in terms of the number of jobs and stimulus to the local economy."	The EIS addresses the need for improved channel conditions as part of the Purpose and Need, Description of Alternatives, Affected Environment, Environmental Consequences, Cumulative Impacts, among other sections. As described in the EIS, no additional vessel traffic is expected to result from the channel widening improvements. Although the improved channel will increase the capacity of the channel to handle additional traffic, a wider channel alone does not create demand for more vessels at the marine terminals at the Port, nor does it increase the capacity of facilities of accommodate increased vessel traffic. Restrictions will be eased, not eliminated. LNG vessels will not transit at night and will still have wind/current restrictions.Both the Pascagoula River Harbor and Bayou Casotte Harbors are densely developed with little property available for development of new deep-draft marine terminals. Statistically, an increase in future vessel traffic is expected, but that increase will be driven by increased capability, demand, or use of existing facilities, not by the availability of a wider channel. As examples: Chevron is currently constructing dock improvements at their Bayou Casotte facility. These improvements may allow additional traffic to call at their facilities, but none of the additional traffic is expected to require a wider channel, thus traffic will increase at the same rate with or without the project. With regard to Gulf LNG, it is certainly the expectation that Gulf LNG will handle vessels (whether they are import or export) at their terminal. While this traffic will be an "increase" in port traffic, it is not dependent on a wider channel and will occur with or without the project. Potential effects of the proposed project on socioeconomics and employment and income are addressed specifically in section 4.18 and 4.18.2, respectively. The Port of Pascagoula is actively working to increase shipments through it public cargo facilities (additional traffic), although any additional traffic expected to be handle at its facilities can be accommodated with or without project.Although there are classes of vessels that cannot currently call on the Port due to channel width, it is a relatively small segment of the world fleet that may not call on the Port of Pascagoula even with a wider channel (container vessels as an example).The benefit of a wider channel is greater operational efficiency (through reduction of delays) in handling both current and future traffic. Certainly as traffic increases through normal growth, the benefits will increase. These efficiencies will result in reduced operating costs for vessel operators and greater availability of marine terminals – an economic benefit for the vessel operators and/or marine terminal. Due to the high cost of operating these vessels, even a small reduction in delay can result in significant savings for an operator. As an example, the day rate for a semisubmersible drill is $250,000 to $400,000 per day. Because of the long transit times and narrow operating window, these vessels regularly wait a day or more for channel availability. With fewer transit restrictions of a wider channel, these delays will be reduced thereby saving the operator time and money, and making the Port of Pascagoula a more attractive alternative for the business. Tanker rates may be up to $20,000 per day and LNG Tanker rates up to $100,000 per day. Although delays to tankers are typically shorter in duration, they are much more frequent and result in significant costs.

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8I	Andrew Whitehurst (cont.)	Letter	NGO	Gulf Restoration Network	338 Baronne St., Suite 200, New Orleans, LA 70112	504/525-1528		Mitigation	8. Mitigation is inadequate.The discussion of mitigation measures in Chapter 6 is opened by cataloging the unavoidable impacts of the dredging project. The entire mitigation section is four pages. There are no mitigation measures that can offset the environmental damage from moving and re-depositing millions of cubic yards of polluted bottom sediments. If this project happens, there are many adverse impacts that cannot be mitigated in any meaningful way. The scant four pages offered in the EIS on mitigation are an admission that there is no way to camouflage this unfortunate fact.What is offered as mitigation looks mostly like management recommendations for contractors. Scheduling to minimize the duration of disturbance is offered as a way to mitigate, as are turbidity control measures. Supplemental analysis of sediments is offered to detect the presence of contamination and letting EPA determine what measures to take. BMPs that protect Gulf sturgeon and sea turtles are offered as a mitigation method. Minimization of greenhouse gas emissions during work by not running engines continuously is offered as a mitigation measure.These mitigation methods are palliative and will not seriously offset the acres of habitat conversion or the long term effect that the uptake of toxic sediments in the dredge spoil will have in the marine environment when they are placed in the disposal areas.	Mitigation is specifically addressed in the EIS in sections 3.16.1, 4.13.1.2, 4.15.3, 4.16.2, 5.3.2, 5.4.16, and Section 6.0. Section 2.2.3 describes the beneficial use of appropriate materials in the existing Littoral Zone Area south of Horn Island. Material that meets criteria established by the EPA in Title 40 C.F.R., Parts 220–228, for the chemical and physical characteristics of the sediments, will subsidize the sediments (particularly sand) transported along the coast (also known as littoral drift), thereby helping to restore the sands deposited to the barrier islands via littoral currents. Results of testing completed in accordance with applicable regulations at 40 CFR 227.13(c), indicate the proposed dredged material is not appropriate for placement at the LZA is environmentally acceptable for ocean dumping. Best Management Practices and other planning and monitoring activities are valid means of avoiding and minimizing potential impacts of the proposed project. Potential oil deposition that may have occurred as a result of the Deepwater Horizon spill in the Gulf of Mexico will be evaluated as sediments are dredged. If oil deposits are encountered in the sediments, the U.S. Coast Guard will be notified, per USACE protocol. Mitigation under 404(b) of the Clean Water Act (CWA) includes avoidance, minimization, and compensation. Mitigation has been developed so that impacts anticipated as a result of the proposed project are reduced to a level that is not significant (per CEQ MOA February 2011). Mitigation consists of avoidance and minimization of impacts and have been accomplished for the proposed project consistent with the Clean Water Act (CWA) under Section 404(b)(1), Environmental Protection Agency (EPA) guidelines that require mitigation through standards set forth in 40 CFR 230.10(a)-(d), dredged material disposal requirements per 40 CFR 227.13(c), Section 10 of the Rivers and Harbors Act, Section 103 of the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972, Section 10 of the ESA, Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Section 106 of the National Historic Preservation Act (NHPA), EPA MOA (1990) guidelines for the USACE implementation of the CWA, and other relevant regulations (permitting requirements are summarized in Section 11.0 of the EIS). Avoidance and minimization provisions are satisfied through the alternatives test called out in 404(b)(1) Guidelines. As a result of adequate minimization and avoidance of anticipated impacts through the development and selection of the least environmentally damaging practicable alternative (the proposed alternative), no additional compensation is required for permit approval. The citations used here are listed below. CEQ MOA. February 2011. From Nancy H. Stutley, Chair CEQ, to Heads of Federal Departments and Agencies. Regarding appropriate use of mitigation and monitoring and clarifying the appropriate use of mitigated findings of No Significant Impact. EPA MOA. February 1990. Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines (Feb. 6, 1990). Nowell, L.H., Ludtke, A.S., Mueller, D.K., and Scott, J.C. 2011. Organic contaminants, trace and major elements, and nutrients in water and sediment sampled in response to the Deepwater Horizon oil spill: U.S. Geological Survey Open-File Report 2011-1271, 128 p.

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8J	Andrew Whitehurst (cont.)	Letter	NGO	Gulf Restoration Network	338 Baronne St., Suite 200, New Orleans, LA 70112	504/525-1528		Cumulative Impacts	9. Cumulative Impacts analysis is inadequate.The cumulative impacts discussion focuses on a time period starting in 2005 and projecting three to five years in the future. Dredge and wetland fill activities from within a five mile radius of Bayou Casotte are considered. Only major industrial activities are discussed in depth with a concentration on those along Bayou Casotte itself.The temporary impacts of the proposed project are emphasized in discussions of water quality and habitat alteration. The dredging activities over the past century that have coincided with the shrinking of the size of the Mississippi Barrier Islands are long term alterations to coastal physical processes. These processes shape the islands that serve as barriers to storm surges and protect the mainland from hurricanes. The history of both the dredged Pascagoula River channel and the Bayou Casotte channel is summarized in the cumulative impacts discussion. However, there is little effort spent discussing the connection between this project and the historical alterations to sediment transport and barrier island building processes that have coincided with a century's worth of channel dredging in the Mississippi Sound as a whole including dredging in the vicinity of the mouth of the Pascagoula River.This project's worst feature with respect to the basic existence of the barrier islands, and Horn Island in particular, is the additional trapping of sediment from longshore currents that will take place within a wider Bayou Casotte channel. This is not a temporary disturbance to coastal processes. This effect is cumulative and additive to all the other channel dredging done in the Mississippi Sound. This project's worst feature with respect to the marine environment is the deposition into open water disposal sites of millions of cubic yards of dredge spoil – bottom sediments laden with decades worth of pollutants such as heavy metals, dioxin, and persistent organochlorine pesticide compounds. The turbidity from the disposal activities during dredging may be a temporary feature of the channel dredging project, but the presence of the toxic compounds will not. These will be on the bottom at the two disposal sites where benthic and other marine organisms will accumulate them in their tissues as illustrated by the laboratory bioassays completed for this EIS.More considered thought needs to go into avoiding the introduction of the worst of the polluted sediment back into the water column at the two open water sites. Decades of accumulation of industrial pollutants through various forms of deposition have obviously left a situation in which dredging will unavoidably disturb them and re-introduce them in disposal areas.Both of these problems are cumulative in nature and remain the biggest obstacles to completing this project without doing further harm to the barrier islands themselves and to the marine ecology of the Mississippi Sound. Avoiding a direct and frank discussion of these in the cumulative impacts section is a weakness for the overall EIS and for the project itself. I appreciate the opportunity to submit these comments and would appreciate receiving your responses to them, or a notification that they are addressed in the final EIS.	The landfall of Hurricane Katrina on August 29, 2005 was chosen as the starting date for the cumulative impact analysis because of its significant impact on coastal Mississippi and the Port of Pascagoula. This is consistent with the Pascagoula Harbor Navigation Channel Final Supplemental EIS. The cumulative impact analysis projects out 3 years because this is the extent to which reasonably foreseeable future projects in the project area have been forecasted. Additional text has been added to Chapter 5 to clarify the basis for choosing this timeframe.The portion of the project area closest to land is at the mouth of the Pascagoula River and should have little effect on the upstream extent of the watershed. The project is located at the eastern end of the Coastal Mississippi watershed, which is ~70 miles long. A dredging project at one end of the watershed is not anticipated to affect the other end of the watershed. The project area includes a five mile radius centered on the Port due because this project is an expansion of an existing Federally-authorized project that services one location. Only major industrial activities are discussed in depth in the cumulative impact analysis because of the similarity of their operations and associated impacts to the proposed project, and the resulting potential for cumulative impacts on the impacted resources. Additional text has been added to to Chapter 5 to clarify the basis for limiting the cumulative impacts analysis to the specified area and projects. As stated in Section 5.4.9, the significance criterion for cumulative impacts to coastal processes is a substantial alteration to tides, currents or sediment transport. Sediment transport has been altered since dredging operations began and barrier islands have been losing area since the 1840s. The cumulative impact of the past and present projects (which are already contributing to sediment loss/altered transport), the proposed project (which involves beneficial use) and reasonably foreseeable projects (only one involves dredging; others are beneficial use) is not anticipated to be a significant alteration of existing patterns. Additional text has been added to Section 5.4.9 and revisions have been made to Table 5.1-1 to address this comment. Language added to Tables ES-1, 2.5-2, and Section 4.18-2 regarding efficiencies resulting in reduced operating costs for vessel operators and greater availability of marine terminal.Please refer to the response to GRN comment 4. The proposed project will result in temporary elevation of some contaminants (e.g., dioxin cogeners, lead and SVOCs) in the water column during dredging operations; however, the impacts to marine organisms (through bioaccumulation) are not expected to be significant because the levels are not toxic and the impacts are not permanent. Please also refer to the responses to other comments regarding sediment quality. Additional text has been added to address the comment regarding cumulative impacts on sediment transport/loss. For the sediment quality and impacts to marine organisms comment, please refer to the response to GRN comment 4.

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9	Paul Necaise Biologist	E-mail	Federal government	U.S Fish and Wildlife Service	Mississippi Field Office, 6578 Dogwood View Parkway, Jackson, MS 39213	228/493-6631	paul_necaise@fws.gov	Proposed Project	The USFWS is concerned with the proposed disposal of +/- 3 million cubic yards of dredged material into the ocean south of the MS barrier islands. Our office submitted comments on this project (see attached), dated November 29, 2011, recommending the Port of Pascagoula (Port) establish a plan to beneficially use all suitable dredged material resulting from this project. The current Draft EIS only recognizes sandy sediments as "suitable" material in regards to beneficial use. Which is the portion (less than 200,000 cubic yards) of material currently proposed to be deposited in the littoral zone east of Horn Island. However, silts, clays, etc. should also be considered suitable material provided they are not considered contaminated by the standards set forth by the MS Beneficial Use Group (MS BUG). The USFWS is highly engaged in the MS BUG, and we recognize that there is no site currently available to dispose of the non sandy (silts, clays, etc.) material that would result from the proposed project. However, the Port should become engaged with the MS BUG to develop a plan, as I suggested in my attached letter, in order to beneficially use all of the material proposed to be taken out of the sediment budget in the MS Sound as a result of this current plan. Further, it is the opinion of the Service that the current draft EIS does not adequately addresses our concerns regarding the impacts to the barrier islands (and sediment budget) as a result of the continued deepening and widening of the ship channels in MS. The significance of these impacts has been discovered by the Mobile Corps planning efforts that have taken place on the current Mississippi Coastal Improvements Plan's Barrier Island Restoration Projects. There are many efforts currently taking place in MS to restore the islands, marshes, and estuarine habitats. The impacts associated with the removal of several million cubic yards of sediment from the sediment budget in the MS Sound is significant and is contradicting to the ongoing efforts to negate those impacts. As mentioned in the last paragraph of our attached letter, the Service recommends the Port engage the MS BUG in order to develop a plan to beneficially use all of the dredged material that results from the proposed project. To our knowledge the Port has not acted on our recommendation in this regard. Further, the Service understands that the EIS is focused on the current conditions, and currently there is no approved beneficial use site that can accommodate several million cubic yards of material. However, the Service recommends the EIS either consider the possibility of a site being established, or allow for a modification to the EIS (or project plan, permit, etc.) to beneficially use the material currently planned to be disposed in the deep water ocean disposal site, should a site be established. There are other similar projects currently being planned by the MS BUG that the FWS believes could compliment each other in order to result in a more efficient and less damaging project. However, this alternative will require coordination with the MS BUG to determine the viability of this alternative. In summary, the USFWS is opposed to the current plan outlined in the Draft EIS. Further, the Service once again recommends the corps, the Port, and the resource agencies work together through the MS BUG to establish another alternative that would provide for the beneficial use of the material proposed to be dredged as a result of this project. The Service appreciates the opportunity to comment on this project and looks forward to working with your office, the Port, and other resource agencies in developing a project plan that would maximize the benefits of the valuable sediments proposed to be displaced as a result of this project.	At the present time, there are no permitted beneficial use sites currently available for disposal. While several have been permitted along the Mississippi Coast, none were considered to be financially feasible or practicable. The proposed placement for new work dredged material evaluated in this EIS includes beneficial use of suitable material in the LZA. If a beneficial use site becomes available for use prior to construction, it will be considered for placement of suitable material. Similar language to this effect is anticipated to be included in a USACE and MDMR permit if authorized.